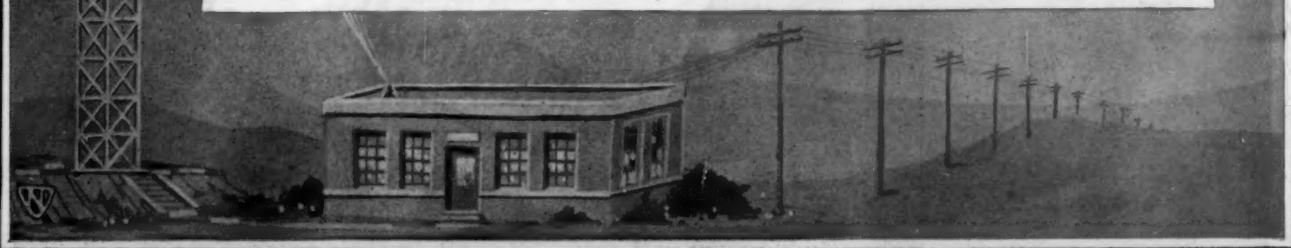
MAY, 1921 20 CENTS

PACIFIC RADIO NEWS

Pioneer Journal of Western Radio News and Development.



2-10

CUNNINGHAM

DETECTOR TUBE

Type C-300

General Electric Quality Plus Cunningham Service

TYPE C300 invites comparison. Amateur requirements decided its design. Many years research of Ideal Amateur Receiving Tube. Detector sensitiveness at low vacuum tube properties have made Type C300 the plate voltages requires that gas action be combined with the electron emission and by a **wonderful new process of manufacture** this gas action is so controlled that the plate voltage for maximum signal audibility is always within **the limits 18—22½ volts. This tube is one of the latest products of the great Research Laboratory of the General Electric Company.** Only a single block cell is needed in the plate circuit—a big saving in battery investment. Type C300 is completely silent in operation—a decided advantage in receiving weak signals.

Any three member vacuum tube is necessarily an amplifier, but the results obtained from Type C300 as a tone frequency amplifier with only 22½ volt plate battery proved a surprise. Again Type C300 invites comparison. Competitive tests show this tube to excell any tone frequency amplifier previously developed. For power amplification in operating loud speaking telephones and in complex and multi-stage circuits use the special Pilotron amplifier Type C301 for freedom from distortion. Write for special Bulletin C301.

Type C300 is a free and persistent oscillator for regenerative amplification and C. W. reception.

The pleasure and satisfaction from operating Type C300 cannot be described. See your dealer today—or write for his name and a copy of Bulletin C300.

Type C-300 $5.00

Dealers: Standard Packages F.O.B. Cleveland, San Francisco, New York. Broken Packages F.O.B. San Francisco.

E. J. Cunningham

Trading as

AUDIOTRON MFG. COMPANY

35 Montgomery Street San Francisco

CONTINENTAL NEWS

MAY, 1921

Published Every Month In Pacific Radio News By Continental Radio and Electric Corporation

Mail Order Service

The Continental Store in New York has built up a reputation for "extraordinary service at ordinary prices." The mail order department has earned a similar reputation and standing through its unvarying standards of Courtesy, Accuracy, Promptness.

Send your next order to Continental, "Where the promise is performed." Please make remittance by P. O. Money Order or Bank Draft, to avoid any delay.

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Radio Craft	$6.00
Nightingale (small)	4.50
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Clapp-Eastham	5.75

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No. A-2 Acme, unmounted	5.00
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No. 226-W Federal	7.50

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No. 7623 Standard, 23.5 V small	$1.50
No. 7625 Standard, 22.5 V large	2.65
No. 7650 Standard, 22.5 V variable	3.50
No. 766 Eveready, 22.5 V large	3.50
No. 763 Eveready, 22.5 V small	2.25
No. 703 Eveready, flashlight cells, set of 10, 45 V	3.50

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No. ZRD Clapp-Eastham (new type)	12.00
No. Y-1 Acme (latest model)	10.00
No. P-500 DeForest, audion ultra-audion type with 45 V "B" battery	24.00
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A1-10 Radio-Craft	15.00

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No. A-1 Arnold, 3500 meters	$22.00
No. Y-673 Clapp-Eastham, 3000 meters	14.00
No. 344 Murdock, 1500 meters	9.00

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All batteries are shipped fully charged.

Anti-capacity Switches

No. 1424 W, D P D T 12 springs	$ 2.80
No. 1426 W, D P S T 4 springs	2.55
No. 1427 W, S P S T 4 springs	2.60

Telephone Jacks

1421 W Open Circuit Jack	$ .70
1422 W Closed Circuit Jack	.86
1423 W, Two Circuit Jack	1.00
1428 W Plug	2.00
Special Creco Plug	1.50

The Continental 112-page catalogue contains complete listings of all radio apparatus, including a comprehensive line of C. W. equipment. Mailed anywhere in the world for 25 cents. Send for your copy today.

PARAGON RECEIVERS MAKE GOOD IN USER'S OWN TESTS

View of Paragon R. A. Ten Amplifying Short Wave Regenerative Receiver — identical with the sets used in these tests.

Licensed under Armstrong and Marconi Patents.

Prominent amateurs endorse Paragons after careful tests and comparisons. "Comes up to all advertised requirements," says Y. M. C. A. Radio School.

A great number of genuine Paragon R.A.Ten Regenerative Receiving Sets are now in actual use, more than fulfilling every advertised superiority.

Mr. J. L. Hornung of the Department of Education, East Side Y. M. C. A., writes:

Gentlemen:

We are in receipt of your Paragon R. A. Ten Regenerative Receiver and wish to extend a few words of appreciation.

The receiver has been given a due trial, in which **comparative tests** have been made with the best types of regenerative receivers now on the market. We find that it comes up to all of the specified requirements made in your advertisements **without any contradictions whatsoever!**

Very truly yours,
Y. M. C. A. Radio School.
By *J. L. Hornung.*

"Heard Stations Never Heard Before"

A recent advertisement for Paragons carried the headline, "You'll hear stations you never heard before." In this connection, this letter from J. Edw. Brown is interesting.

Glenbrook, Conn.

Gentlemen:

I thought it may be of interest to you to know about the Paragon R. A. Ten Receiver just installed a short time ago.

I hooked this up on the evening of Jan 8. The first thing picked up was **Wisconsin.** From that time on we "heard stations that had never been heard before" in this section.

I picked up the steamer Glouster (KQG) off Barnegat, talking to Asbury Park **on detector alone,** as the first stage amplifier was uncomfortable for the ears.

Another surprise was that the instrument seems to be protected, as I failed to get any body capacity whatever!

This is the best by far that I have ever heard—especially for strength of signals on detector alone.

I congratulate you on having such a wonderful machine—and at the price of $85.00—for at this amount it places the instrument within the reach of most amateurs.

Very truly,
J. Edw. Brown.

Another amateur with a similar experience writes:

Bayshore, New York.

Gentlemen:

I have recently had the pleasure of trying out one of your Paragon R. A. TENS, and I am taking this time to congratulate you upon the design and construction of the tuner that, in my opinion, is the best thing that ever was placed on the market. Stations that, before the R. A.'s installation were QRZ, or not heard at all, pounded in as though a two step had been added to the set; and the tuning was much sharper than I had hitherto ever experienced.

There are two points that are especially to be commended: The ability to tune down to 150 meters with **no loss of amplification,** and the insensitiveness of the tuner to external capacity effects. These two points render it entirely possible to handle traffic by long jumps under the jam of 200 and up.

I trust that you may be interested in the results as enumerated, and in the points of superiority, over other tuners, that struck me forcibly.

Very truly yours,
2BGR *Tremaine House.*

The letters quoted here, as well as many others of similar nature, are on file at our office. Such whole-hearted endorsement from experienced operators should guide you in your radio work. A Paragon Receiver may cost Eighty-five Dollars, to be sure—**But,** a genuine Paragon is nevertheless the best "buy," per dollar, on the market. Remember, also, the guarantee is for **Two Years.** The instrument is built to long outlast the guarantee.

Order a Paragon R. A. Ten, or get our descriptive booklet by using the coupon below.

Outstanding features of the Genuine

PARAGON R. A. TEN

(Registered U. S. Patent Office)

Amplifying Short Wave Receiver

Wave length, 160 to 1,000 meters.
Amplification 100 times.
No dead end losses whatever.
Vernier attachments on all controls.
Coupling has scale of 1800.
Free from all body capacity effects.
Guaranteed for *two* years.
"The weaker the signal, the stronger the amplification."
Price, eighty-five dollars.

Continental Radio and Electric Corp., Dept. G74, 6 Warren St., New York.

☐ Enclosed find remittance for Eighty-five Dollars. Ship me at once one Paragon R. A. Ten.

☐ Send me your free illustrated booklet, containing complete description of the Paragon R. A. Ten.

Name .....

Address .....

City .....
State .....

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RADIO AND ELECTRIC CORP.

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GET MUSICAL SIGNALS---NOT MUSICAL TUBES

"They don't sing"

RADIOTRONS
The Noiseless Tubes

RADIOTRONS are manufactured by the General Electric Company in accordance with rigid specifications. Long life and unequalled performance are foremost factors.

RADIOTRON UV, 200 is not only the best detector and "Spark receptor" designed to date, but it is also an excellent tone frequency amplifier for magnification of the telephone currents in vacuum tube receiving circuits. Filament operates on 6-volt source at 1.1 amperes. Plate circuit requires from 18 to 22½ volts. Price **$5.00**

RADIOTRON UV, 201. An amplifying tube of rigid operating characteristics. UV 201 is a vacuum tube amplifier which will magnify the telephone currents in a radio receiving set and which can be shifted from one socket to another in a cascade outfit without loss of signal audibility. Filament operates on 6-vole source at 1.1. Plate circuit designed for connection to 40 to 100 volt source. Price..... **$6.50**

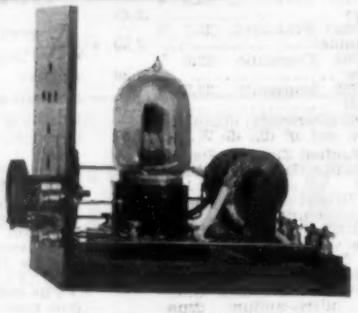
RADIOTRON UV, 202. A power tube rated at 5 watt output. Filament current 7.5 volts at 2.35 amperes. Normal plate potential 350. Price **$8.00**

DEALERS WRITE FOR OUR PROPOSITION ON RADIOTRONS

AN IDEAL COMBINATION

THE PEN BRAND DETECTOR
and Radiotron Tube

A Detector Panel designed for the Radiotron tube. The condenser is the RIGHT capacity which insures maximum signal strength. All bakelite socket, Panel rheostat, etc. Neat in appearance, efficient in operation. **$6.50**



The Pen Brand Single Stage Amplifier

The Amplifier That Amplifies

The Amplifier unit to match detector is the same in dimensions and appearance, Acme amplifying transformer used, of course. Price **$13.25**

Pen Brand Fan Switch

For those desiring to use a fixed step condenser. Ideal for CW sets or step bridging condenser. Price $1.00.

Pen Brand Series Parallel Switch

An absolute necessity in an experimental station. For changing the position of condensers, from series to parallel changing coils, switching from loud speaker to receivers, from one to two pairs of receivers, etc. Absolutely necessary with honey comb coils. **PRICE, $1.25.**

Pen Brand Grid Condenser

One amateur writes: "The **Pen Brand** Condenser I bought from you works great. Why should a fellow pay $4.00 for a variable condenser when you can get a **Pen Brand** for $1.00 which works a 100 times better."

Another amateur in Milton, Iowa, says: "It is by far the best grid condenser I have ever used, and I have had many. The neat construction is another good advantage over all others. It is well worth the price you ask, and I am entirely satisfied with it."

METERS

0—100 M. A. Weston	$8.50
0—300 M. A. Radio Telephone Shop	$8.50
0—500 M. A. Radio Telephone Shop	$8.50
0-500 D. C. Voltmeter	$15.00

All meters are 3-inch flush type.

PEN BRAND PRODUCTS

HE NOW HAS TWO PEN BRAND GRID CONDENSERS

From Corsecana, Texas—"I am highly pleased with this one. I put it in VT control cabinet made for and used on Paragon R. A. Ten and very promptly picked up the radio-fone on Catalina Island. The voices very clear and easily understood on one VT. This shows that this Grid condenser is just the right capacity and am well pleased with it."

Our money-back proposition gives you a chance to compare a Pen Brand Grid Condenser with the one you are using. **PRICE, $1.00.**

Dealers:
The rapidly increasing demand for PEN BRAND products will necessitate your stocking of our equipment. Write for our proposition today.

The Radio Telephone Shop—"6UV"

175 Steuart Street **San Francisco**

VOLUME II MAY, 1921 NUMBER 10

PACIFIC RADIO NEWS

PAUL R. FENNER
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L. MOTT
Assoc. Editor
H. W. DICKOW
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RADIOTORIAL

BY THE EDITOR

THE NEW RADIO LICENSES

FOR the first time in the history of Radio communication a more than ordinary distinction between the various classes of Radio men in the commercial field is to be made.

At the present time there are only two classes of professional operators—first and second grade. There is a third grade that is hardly worth mentioning.

Several months ago, representatives of the various radio service companies, steamship owners and officers of the United Radio Telegraphers' Association conferred with Secretary Alexander and Commissioner Chamberlain for the purpose of establishing a new system of radio licenses for commercial operators. An acceptable system was inaugurated. It becomes effective on July 1, 1921. The speed minimum has been increased from 20 words a minute to 25 words a minute. This new ruling is indeed welcomed by all commerical and government radio men, and particularly by the shore station operators who have been handling traffic with vessels at sea. The average ship operator is hardly capable of transacting his business consistently at a speed of more than 20 words a minute.

The Radio Convention of 1912 provided for a first and second class license. Under the new ruling, licenses issued by the Department of Commerce will be graded according to the length of service of the holder of a license. A successful applicant for a commercial license will first receive a third grade, second class license. He will not receive his first grade license until his commercial radio service warrants the issuance of same.

It will be impossible in the future for an inexperienced operator to obtain a commercial first grade license. His experience will be clearly shown by the grade of license that he holds. Operators have often been placed in charge of the radio equipment aboard ship without any previous experience whatsoever. As a war-time measure such misplacement was unavoidable but it should not be tolerated when the supply of commercial operators far exceed the demand. The standing of the **professional** operator has been lowered considerably by such action on the part of the various commercial companies.

Salaries paid to ship operators several years ago were as low as $35.00 a month. The present day ship operator receives from $85.00 to $125.00 a month with a substantial allowance for port pay. A beginner in commercial radio is not entitled to such salaries and the new license system will keep many from entering the commercial field. It is generally understood that salaries will be paid according to the grade of license held. If this system is placed into effect, the professional old-time operator should receive an increase in salary.

In this manner, chance will be a very small factor. Advancement and salary increases will be the reward of the deserving.

Announcement

IT gives us much pleasure to announce that United States Deputy Game Warden Mr. Lawrence Mott of New York City and Avalon, Catalina Island, California, has joined the staff of "Pacific Radio News," as Associate Editor. By profession Mr. Mott is a well known author, his first book having been published by the Century Company of New York, while he was still in Harvard, from which seat of learning he graduated in '05. Since that time Mr. Mott has traveled up and down and round-about the world in search of sport — big game shooting, fishing — and gathering material for his many books and short stories. He was staff correspondent for the New York "Sun" in the Far East during a period of the war, and, for various services rendered has been decorated by foreign governments.

Warden Mott has ever been a radio enthusiast. He is a firm believer in marvels STILL to be achieved, and is continually experimenting at his up-to-the-minute station on Catalina Island. He confines himself exclusively to CW work, being convinced that along these lines lies the REAL future of radio effort. Our new Associate Edtior will, from time to time, give us editorials, and articles that will be found pertinent to matters in which we are all interested.

New York Office.....147 Sixth Ave. Portland Office.....420 Bd. of Trade Bldg. Seattle Office.....419 Pioneer Bldg.
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EDITOR'S NOTE

Mr, A. K. Aster has written four articles for "Pacific Radio News", the first of which appears herewith. Each article will be in the form of a complete chapter.

Chapter 2 deals with Voltage Amplifiers: Chapter 3 deals with Power Amplifiers; Chapter 4 describes the new system of tape reception using a vacuum tube.

THE AUDION AMPLIFIER

By A. K. ASTER

Instructor, Department of Physics, University of California

THE important part which relay and long distance work is playing in the amateur field today makes it necessary for the amateur to thoroughly understand audion amplifiers if he desires to be up to date. From personal observation, it is evident to me that amplifiers are very little understood. In this and a series of articles which are to follow it, I will make an attempt to explain the action of the audion as an amplifier and then discuss the various types of amplifiers suitable for radio telegraphic and telephonic work.

In 1884 Edison was apparantly examining the phenomena involved when carbon filament lamps are run at high efficiency. He discovered that if he placed a metal plate between the legs of a horseshoe-shaped filament in a carbon filament lamp and connected a wire from the plate through a galvanometer to the positive side of the filament (the filament being heated by a direct current) that the galvanometer indicated a few milliamperes when the filament was glowing. He observed that when the plate was connected to the negative side of the filament little or no current flowed. This was the first important discovery which lead to the present audion. The phenomena he discovered is known as the "Edison Effect."

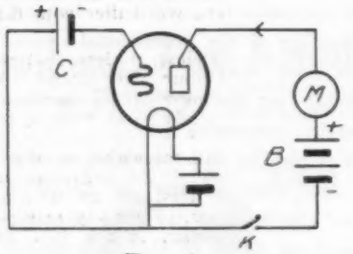


Fig. 1

In 1904 Fleming made use of this phenomena in his so-called "Fleming Valve" for the detection of radio signals. This device is too well known to need further description here. Those who are not familiar with it will find it described in any good book on Wireless Telegraphy.

In 1907 Lee de Forest inserted a grid between the filament and plate and found that he thereby could control the current flowing from the plate to filament. He called this new device the "Audion."

The action of the thermionic valve as the audion is commonly called today is as follows: Referring to Fig. 1, first assume the case where there is no grid in the tube at all. As soon as key (k) is closed the battery (b) charges the plate positively and attracts to it the negative electrons which are being shot off from the hot filament, this causes a current to flow in the direction indicated by the arrows on the diagram. This current is commonly referred to as the plate current. Now assume a grid to be placed between the plate and filament. Here we will consider four cases.

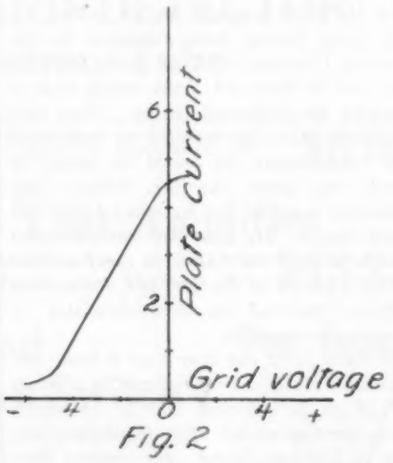


Fig. 2

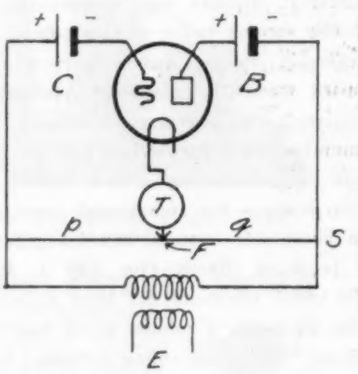
1. Assume the grid to be entirely insulated from the plate and filament. Some of the negative electrons shot off from the filament and attracted to the plate will strike the grid and charge it negatively. This charging will continue (assuming no leakage) until the grid is charged so highly negative as to repel practically all the negative electrons shot off from the filament and hence practically stop the plate current.

2. Assume the grid to be connected to the positive side of the filament. The grid will now act as a second plate and because of its positive charge attract to it some of the electrons from the filament, and as will be expected, a small grid current will flow. Some of the electrons attracted to the grid wil miss it and go on to the more positive plate and hence increase the plate current slightly, the amount depending on the grid and plate potentials.

3. Assume the grid to be controlled to the mid-point of a resistance connected directly across the filament (not shown in the diagram). The grid will now be at zero potential with respect to the filament.

It will therefore neither attract or repel electrons shot off from the filament In their course from the filament to the place a few electrons will strike the grid and charge it negatively. This charge will be conducted away to the filament and the grid will remain at zero potential with respect to the filament. The result is that the tube will act as though there were no grid in it at all.

Fig. 3



4. Assume the grid connected to the negative side of the filament. The grid will now be charged negatively, the amount depending on the tube, filament, battery, etc. It will then act as a partial barrier to the electrons flowing from the filament to the plate and a complete one if the grid is charged negative to a sufficient degree. This does not occur in practice unless a sufficiently large negative grid battery is put in the circuit.

From the above statements it is obvious that the grid acts as a controlling device for the stream of electrons flowing from the filament to the plate. Let us now examine this phenomena a little further. Take a circuit such as Fig. 1 and place a milliameter in the plate circuit and provide some means in the grid circuit for varying the potential from

say (—50) to (+50) volts and put 100 volts in the plate circuit. Now leave the plate voltage and plot the values of the plate current for the various values of grid voltage. The result will be that of a curve of the form of Fig. 2. It will be observed that if we keep on the straight portion of the curve, a given change in grid voltage will produce a large change in plate current, hence a large change in voltage across the plate load assuming the resistance of the plate circuit to remain constant. This is the amplifying action of audion and the property which makes it suitable for amplifying radio, telephone and other currents. The ratio of a resulting change in plate load voltage to a given change in grid voltage is the so-called voltage amplification constant of a tube. This varies from 5 to 40 in practice although tubes having a factor as high as 200 have been built but they are not stable in operation. This factor is nearly constant over the usable range of the tube as is for the most part dependent on the structural dimensions of the tube although somewhat dependent on the voltage and filament current.

The voltage amplification constant of a tube can be easily measured by a simple bridge. Arrange a circuit as shown in Fig. 3 (b) and (c) are the plate and grid batteries respectively. (S) is a slide wire of about 40 or 50 ohms resistance. This should be about 3 or 4 feet long and stretched in a straight line, never wound on a drum, for best results. (E) is a buzzer having a secondary winding or a transformer connected to a suitable source of alternating current (about 500 cycles is best) and (T) a telephone receiver. To operate this bridge proceed as follows. Adjust the grid and plate batteries to the values that are normally used with the tube under test. Then adjust the slider (F) on the slide wire till a minimum sound is heard in the telephone receiver, then if (p) is the length of the slide wire on the grid side of the slider and (q) the length on the plate side (q) divided by (p) gives the voltage amplification constant of the tube for the particular grid and plate voltages and filament current used. The lengths (p) and (q) can be measured in any convenient units, inches, centimeters or any other one as long as they are both measured in the same units. By this simple means the amateur can easily determine the voltage amplification constant of the tubes he is using.

The reader should not be misled at this point to think that the factor for a given tube will give the amount of amplification he can expect from an amplifying circuit. The amplification produced by any amplifying circuit depends largely on the type and electrical constants of the circuit as well as the tube used in it. The amplification constant, does, to be sure, give very nearly the amplification produced by certain types of voltage amplifiers. This matter will be discussed later.

In the next article certain types of amplifying circuits will be discussed.

WHY NOT A "CW" CLUB?

By LAWRENCE MOTT
Associate Editor

KNIGHTS of the CW!

Can we not get together and have CW nights?

Far be it from me to decry the Hon. Spark Brotherhood—of Vast Numbers and Degree! They are enthusiastic—oh, very!—gentlemen—all! They are—many of them—kindly, and well disposed toward us, of the CW few! But—taking it by and large—there is only a pathetically small number of Brothers' Sparks who will take the trouble to tune in for the sparsely scattered CW men? The spark emitters out number CW operators! They easily drown-out CW! And —without selfish intent, I am sure—they so far—have effectually blocked any efficient CW experimentation—that is, in and about Los Angeles!

Let me put it bluntly. CW is THE coming thing—in radio communication. I quite appreciate the point of view of spark men. They have—more or less expensively—set up unto themselves more—or less—efficient stations, and they like not the thought of having to choose between two—to them—evils: (1) junk the soon-to-be ancient and hoary spark —and install CW—or (2) give up radio work!

But Progress marches steadily onward —be it remembered! When radio was first discussed, the **line** owners laughed, loudly, long and uproariously — and fought radio effort—fearful as to that which would happen to their **lines** should radio become efficient! But was radio downhearted? NO! The world-wide recognition that it has earned for itself speaks with resounding loudness! So shall it be with CW—among the amateur enthusiasts!

However, all this by-the-way.

Perhaps fellow CW operators on the Pacific Coast, and elsewhere, will join with me in trying to get together for say, two nights each week, at stated hours, and on pre-arranged, **exact** wavelengths. I am **convinced** that in this way, and only in this way, can we do satisfactory work, and without causing the lease QRM to the spark chaps. In other words, I am a firm believer in "live and let live"! I ask a fair chance for CW work and investigational effort —from spark operators! If CW co-enthusiasts will immediately write to me, giving their operating wave-lengths, station data, details, etc., I shall, with pleasure, collect this material, assemble it in succinct form, arrange hours for CW work, and then beg the courtesy of Ye Ed of "P.R.N." to publish it. CW men will then have some authentic information that, as a nucleus, will, I hope, lead to excellent co-operation and **effective results.** I would further suggest that CW men form a Club, or Association, to be known as "The Pacific CW Club", or any kind, simly a small (as yet) group of men, banded together for the furthering of their lines of endeavor. Should such a Club come into existence I am sure that enough UNSELFISH spark operators can be found who will not "hog" the air spaces on the nights that we are working, a short time each night. It is not much to ask, for the **advancement of radio work!**

And, to use famous (!) words, "may I not" point out to amateurs that the authorities at Washington are most kindly disposed toward amateur work in general, realizing, very properly, that these efforts, when conducted **within** the rules and regulations set down for them tend strongly for the good of radio advancement of these United States. BUT that Washington cannot, and will not, approve of operators who deliberately and wilfully exceed wave-lengths the amount of power they use, is a foregone conclusion. The law-breakers, may and do, "get away" with this sort of thing for a time, but the day will undoubtedly come when a **sudden** official round-up will be made, and sad indeed will be the hearts of many amateurs, who now nightly fill the air with "horrid sound", on the broadest of broad kind of transmission. Should more severe restrictions be placed on the amateur classes, the recklessly-broad operators will be the ones that the rest o' us will have to thank. And the innocent chaps, the fellows who are **serious** in their radio efforts, will suffer with the others!

Why all this senseless, **useless** chatter, night after night, hour after hour? A nerve-racking pandemonium of sound, in which CW is hopelessly lost! Owing to differences in time, if we, on the Pacific Coast, hang on until midnight, or after, to work a CW friend in the mid-west, or father, that friend must sit up until 2 and 3 in the morning, to get any results, and it is an imposition to ask this, as a regular diet!

Hence I reiterate the plea: If CW operators can form a little Club of their own, with their own officers, will spark men give a bit of time, twice a week, to CW experiment and effort?

And will CW men, reading these lines and interested in the idea, write to me, at Avalon, Catalina Island, California, giving me the data that I have requested?

I would call attention to the fact thet —having been granted a Commercial License, Experiment Grade, and a Station License to operate it on various wavelengths—**my call letters have been changed from 6BX to 6XAD.**

The Station of U. S. Deputy Game Warden, Lawrence Mott, Situated at Avalon, Catalina Island, Calif., has been granted a Commercial Operating License—Experiment Grade—and the Call Letters changed from "6BX" to "6XAD". He asks that his many friends please NOTE this, when calling him, and when listening for him.

This Department is conducted by the U. S. Radio Inspectors of the Sixth District.
CO-OPERATE!

WITH THE RADIO INSPECTOR

Questions answered by the Inspector.
No names will be printed.
Initial your letters only.

FOREWORD: THE RESPONSE TO OUR REQUEST FOR QUESTIONS TO BE ANSWERED IN THIS DEPARTMENT HAS NOT BEEN GENEROUS. WE AGAIN ASK YOU TO USE THESE COLUMNS.

AN OPEN LETTER FROM THE INSPECTOR

DEPARTMENT OF COMMERCE
Navigation Service
Office of Radio Inspector
Custom House,
San Francisco, Calif. March 15, 1921.

Editor, Pacific Radio News,
San Francisco, Calif.

Dear Sir:

I would like to call the attention of the readers of your Magazine to a few pertinent points in connection with the operation of amateur radio stations, chiefly as regards violations of the Radio Laws and Regulations.

1. The use of "two letter", or initial calls is unlawful.

2. No authority for wave-lengths in excess of 200 meters may be granted for radio telephone sets.

3. Telephone sets require licenses just the same as radio telegraph stations.

I have observed that, in a number of cases, amateurs who are assigned regular official call letters do not use them. Instead, they use the last two letters of the call (or three letters, as the case may be), and omit entirely to use the numeral part of the call. This constitutes, in effect, the signing of false call letters, as no call letters, or signals can be used by any station except the calls assigned by the Department of Commerce, which is given on the station license. This does not, of course, mean that "personal" signs may not be used, when there are several operators in a station, but if these latter are used, the full and complete official call must also be used at the same time so that no doubt as to the identity of the station may exist to anyone who may happen to hear it working.

A number of experimenters and amateurs seem to be of the erroneous opinion that the use of operation of a tube telephone, or continuous wave transmitter is sufficient excuse to use a longer wave-length than 200 meters. This is absolutely and entirely contrary to law, and anyone who so operates is liable to prosecution under the Radio Laws, unless specific authority to use a longer wave-length has been granted under a special or experimental station license, in the usual manner. I might add that the desire to operate a telephone on these longer waves does NOT constitute any reason for the issuance of a special or experimental license.

In all cases licenses for both station and operator are required where the operation of a radio telephone transmitter is desired. These licenses and the examination for them are all exactly the same as for a telegraph equipment. This requires that the operator be able to copy at least 10 words per minute in the Continental Morse Code and to answer a number of reasonable questions concerning the operation and adjustment of his apparatus and the Laws and Regulations governing radio communication.

Contrary to popular impression, a telephone or vacuum tube transmitter will operate on 200 meters as well as on any longer wave-length. I have experimented with vacuum tubes myself and have found no trouble in getting to 200 meters and even lower. I used two 5W. tubes on various wave-lengths. On 375 meters I obtained about 1.2 amperes and with the same apparatus I returned to 200 meters and the radiation dropped to about 1.1 amperes, and 180 meters, which was the lowest wave-length I attempted at this time, radiated just a little over 1 ampere. The natural period of the antenna I used was 140 meters, and on the lower wave-length I was only able to use an extremely small inductance in the antenna circuit, which inductance was not sufficient for maximum coupling. If my antenna had been a little smaller, I do not believe that the radiation would have decreased noticeably on the lower wave, and other experiments I have performed indicated the same result. I have seen one vacuum tube radiate efficiently on 90 meters, the radiation being about .6 of an ampere, on a single 5 W. tube. In this case the antenna had a natural period of but 40 meters, which indicates that the great trouble with most amateur telephones is that they are unable to get reasonable coupling on 200 meters, and I believe that if the amateurs who claim that they are unable to get their tubes on 200 meters will cut their antennae in half that they would have no trouble in reaching the wave-leneth they desire.

Respectfully, D. B. McGOWN,
Asst. Radio Inspector.

QUESTIONS *and* ANSWERS

A. K. Selma, Cal., asks:

Ques.—I have a radio set which will not send outside of the state. It is a one-inch coil, and I am located in a small town near Fresno. Do I need a license?

Ans.—Yes. The law states that all stations must be licensed where they transmit to beyond the borders of the state, or WHERE INTERFERENCE WITH THE RECEPTION OF SIGNALS FROM BEYOND THE STATE WOULD OCCUR. It is not possible that a transmitting set of any kind could be so arranged so that some times its operation might not interfere with someone receiving signals from outside of the state, hence all stations, as well as yours, must be licensed.

Ques.—I have a copy of the Radio Laws and Regulations. It says that I may obtain a license by applying by mail, as I am unable to come to San Francisco for examination. How is this done?

Ans.—Address Radio Inspector, 215 Custom House, San Francisco, and the necessary blanks will be sent you. It is necessary for you to show evidence, usually in the form of an affidavit, that you are able to send and receive at the rate of ten words per minute, five letters per word, and answer fully all the questions asked on the application blank.

F. G. G., Los Banos, says.

A number of unlicensed spark coils near me interfere greatly with me. I have a receiving set only. I tell these fellows they should have licenses, and they laugh at me. Is a license necessary? They interfere particularly with the reception of signals from Seventh District amateurs.

Ans.—Yes, they must be licensed. Heavy fines and imprisonment are provided for the punishment of persons who send without licenses. See answer above to A. K. of Selma. This clearly comes under the law's provisions, as the signals from the Seventh District come from outside the state.

R. J. L., Eureka, Cal.:

Ques.—Where can a call list of amateurs be obtained?

Ans.—The book "Amateur Stations of the United States," edition of June 30, 1921, is the best we know of. Send 15 cents (no stamps) to Superintendent of Documents, Government Printing Office, Washington, D. C., and the book may be obtained. A similar book, "Government and Commercial Stations of the United States," which contains all special stations as well, may be obtained for 15 cents from the same address.

The JANKE ARC

By H. L. RODMAN

ESSENTIALLY, the Janke arc is an arc burning between two electrodes in a non-conducting fluid.

Practically every known metal has been used in the construction of experimental electrodes and several different kinds of non-conducting fluids have been tried in the many efforts to perfect the Janke arc, but the best results have been obtained by making the anode out of copper, the cathode of carbon, and by the use of denatured alcohol as the non-conducting fluid.

Strictly speaking, alcohol is not a non-conductor, but the term has been accepted by the United States Patent Office as applied to this arc. Alcohol does, however, offer an extremely high resistance to radio-frequency currents, and a somewhat less but still high resistance to direct current.

Under certain well defined conditions this arc will produce radio-frequency oscillations. Current is fed to the arc under a pressure of 200 to 500 volts. A capacity and inductance are arranged in the circuit as shown in cut 1. For wavelengths in the neighborhood of 1,000 meters the capacity should be 2 mf. The inductance is kept as low as possible. The electrodes are completely immersed in the alcohol. If now the arc is struck and adjusted carefully, strong oscillations are produced in the closed oscillating circuit, which may be transferred to the antenna through the oscillation transformer.

The arc is automatically kept in adjustment by a solenoid attached to the anode, which also functions as a choke coil.

The design and construction of this solenoid must be very exact.

The anode holder, to the upper end of which is attached the solenoid core, and to the lower end the copper anode tip, is constructed of brass tubing. Vents are provided so that the gas forming at the electrodes rises to the upper part of the container where it is cooled by the water cooling coils and condensed back into liquid.

The anode tip is of an inverted cup shape, which provides a small chamber wherein the arc proper takes place. This cup shaped anode fits down over the carbon cathode which is held in place at the bottom of the container by holders provided for the purpose.

When the arc is burning, a small pocket of hydrocarbon vapor is formed between the electrodes, which is the real secret of the oscillations. No magnetic field is used, however, to "scavenge" the arc, and therein lies its principle difference from the Poulsen arc.

Alcohol, being an excellent cooling medium, performs a second very important function in dissipating the intense heat of the arc. In performing this function, the temperature of the alcohol of course has a tendency to rise greatly, but is prevented from doing so by a set of copper cooling coils which line the inner wall of the container, through which cold water is circulated.

The oscillations produced by the Janke arc are not as steady as those produced by the Poulsen arc. For this reason they are unsatisfactory for telegraph purposes. They are, however, suitable to a certain degree for telephone purposes.

If the engineering skill were to be applied to the Janke arc that has been applied to other systems, a good radio telephone and telegraph system might be developed.

The problems presented in this small arc, however, are really very great. The difficulty and danger of a very highly explosive substance which is created on the electrodes while the arc is burning is one in particular.

This substance was shown by one chemist to be copper acetylid. A slight tap with a metal object such as a screwdriver will explode any quantity. It is extremely sensitive to impact and heat.

This explosive is only dangerous when the electrodes are lifted out for repairs or cleaning. As long as the electrodes are immersed in the alcohol, the copper acetylid is not dangerous.

As in the Poulsen arc, the cooling of the copper anode is important, and for this reason three sets of electrodes in series are used to provide a larger cooling surface.

Each anode plays in a sheath and a spider clutch is so arranged that when the arc is struck by the lifting solenoid, the length of each of the three arc gaps is identical.

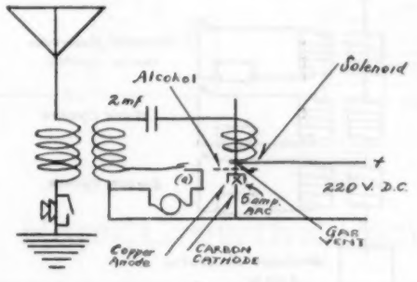


FIG 1

Due to the fact that there is no means provided in this arc for restoring the resistance of the arc gap during the charging portion of the cycle, the efficiency is comparatively low. This same omission is also partly responsible for the fact that the oscillations produced are not as steady as those of the Poulsen arc.

By inserting a micraphone transmitter in the ground lead, good telephonic results have been obtained, but here again is met the old problems of micraphone current limitations.

The radiation must be confined to two or three amperes and even this current at radio-frequency will very quickly overheat almost any micraphone.

The microphone most successfully used at the Fairmont Hotel experimental station, in San Francisco, were water cooled, but although the heat is rapidly carried off by water, the carbon granules are not prevented from becoming white hot, under which heat the transmitter rapidly deteriorates.

It will be noted that the closed oscillating circuit is inductively coupled to the antenna circuit. This is instrumental in weeding out harmonics. The tuning between primary and secondary is extremely sharp. A very slight detuning on either side of resonance will decrease the antenna current to almost zero.

This latter feature is brought into use when the set is used for telegraphing. One turn of the primary is shorted by a key, as at (a) in cut 1, with or without the chopper in series. The chopper may be cut in or out by the chopper shorting switch.

When this one primary turn is shorted by closing the key, the open and closed circuits are thrown out of resonance and the antenna current drops to nearly zero.

Using a wavelength of 1,800 meters, it is only necessary to detune the primary 75 to 100 meters to produce this effect.

Due to the fact that the potential difference across one turn of inductance is very low when using a current of five amperes through the arc, there is almost no sparking at the key or across the chopper when the latter is used. The note produced by the chopper is fully as clear as is obtained by the chopper interrupting a direct current circuit of equal current.

This method of signalling proved much more satisfactory than putting the key and chopper in series with the ground lead. The microphone placed in this position, however, does not function anywhere near as well as when directly in series with the ground lead.

It is apparent that in this system a low ground resistance and an antenna carefully designed as to capacity for the wavelength and power to be employed are of utmost importance. The antenna circuit, including the turns of inductance used, must be of the lowest resistance possible to obtain maximum radiation and over-all efficiency.

There are possibilities in this arc, and it is not difficult to construct an experimental set. The fact that no magnetic field is necessary as in the Poulsen arc makes the construction of the arc proper comparatively simple.

A one-half kilowatt set operating on 110 volts has been used successfully but the efficiency decreases on low voltage. 220 volts has been found to be most satisfactory.

This arc has also been applied to experiments in other branches of high frequency work, and there are also unlimited possibilities there, as well as its application to medical science.

As to practical results obtained, with a radiation of 2.75 amperes in the antenna at the Fairmont Hotel, San Francisco, the voice was heard and the conversation reported in detail by an operator at Vancouver, B. C., and by ships at sea in the neighborhood of 1500 miles.

But it all comes back to the current carrying limitations of the micraphone. Some other system of modulation must be used other than a micraphone transmitter inserted in the ground lead, to make this system a success for long distances. This, of course, is not by any means impossible.

The Janke patents are owned by the National Radio Company, of San Francisco, Calif.

LIEUT. E. W. STONE ADDRESSES COMMONWEALTH CLUB

RADIO Telephones were the topic of a lecture by Lt. E. W. Stone to the members of the San Francisco Commonwealth Club recently. A complete receiver was installed at the Palace Hotel and the members were entertained with music from the California Theatre.

Pacific Radio News May 1921

THE DUO-FREQUENCY SYSTEM OF SEMI-SECRET TRANSMISSION

By H. Tenny

ALTHOUGH the fact has not become generally known in the amateur world, we are about to witness a remarkable development in vacuum-tube transmission, which will be caused by the application of the multi-frequency principle, the apparent possibilities of which are truly astounding.

The extent to which this latest phase of vacuum-tube work has been developed in the laboratories of the large electrical plants who are exploiting the vacuum tube is only a matter of conjecture. The writer has heard vague rumors which lead him to believe that the bulk of present research work is directed toward the development of super-imposed frequencies on undampt waves with the objectives of multiplex transmission and reception, reduction of interference, secrecy of transmission, and increased utilization of restricted wave-length ranges permitted by law for certain classes of communication.

The realization of these invaluable benefits is being sought through the utilization of the range of frequencies which lies between highest perceptible audibility (about 6,000 cycles per second) and lowest common radio frequencies (wavelength of 10,000 to 15,000 meters.)

The simplest application of this principle consists of:

(a) The generation and radiation of an undampt radio frequency, preferably the optimum length with respect to the fundamental of the antenna.

(b) The superimposition on this "carrier" of one or more secondary frequencies, which will effect, in equivalent, "100% modulation." These frequencies will preferably be above audibility and below radio range.

(c) The modulation of these frequencies for signaling purposes, either by voice, chopper, or key.

(d) Primary reception of carrier frequency with standard receiving apparatus.

(e) Selective individual tuning of the superimposed frequencies by means of separately coupled tuned amplifier circuits.

A schematic and purely theoretical circuit which will, to a certain degree, accomplish these ends, is shown in Figure 1. The practical working of such an arrangement would be for a number of reasons, an impossibility.

For preliminary experimental purposes we may confine ourselves to a single secondary frequency, using a single power tube as a generator for both the carrier and secondary frequency. Within certain limits this can be successfully done, and has the advantage of requiring none but standard and common pieces of apparatus which can be easily and cheaply obtained.

In the "Colpitts" transmitter circuit the secondary frequency can be generated by regenerative coupling between ocillatory circuits placed in the plate and grid leads, the frequency generated being the frequency of the grid circuit. As illustrated in Figure 2, honeycomb or duolateral inductances of the 1200 turn size can be used with standard variable or fixed receiving type condensers for forming the circuits. Signalling for transmission can be best accomplished by coupling several turns of inductance to the grid coil, short-circuiting them with the sending key. Pressing the key will then cause a change of inductance in the grid coil, changing the frequency generated, and will be tuned for at the receiving end in the same manner as for compensated-system signals in highpower arc work.

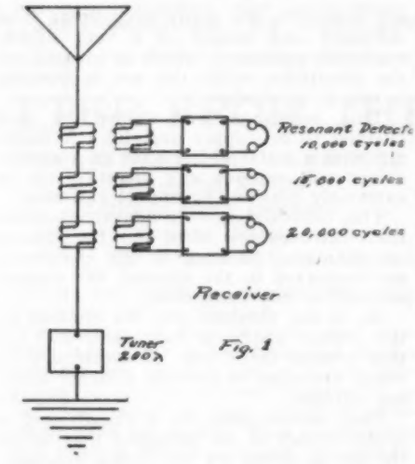


Fig. 1

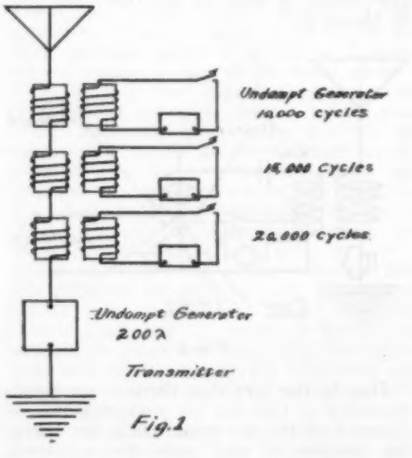


Fig. 1

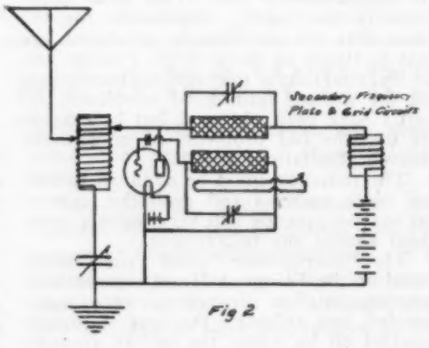


Fig 2

Figure 1. Transmitter and Receiver diagram.

Figure 2. Secondary Frequency Modulator, adapted to Colpitts Transmitting Circuit.

Figure 3—Standard Regenerative Receiver equipped to Heterodyne secondary frequencies.

Figure 4. Secondary Frequency modulation by Heising system.

Figure 5. Amplification of secondary frequencies by resonant transformer method, using regenerative and oscillating amplifier circuit.

Figure 6. Duplex reception with one tube, using compensating keying on both carrier and secondary frequency.

The minimum capacity of the condensers used should be not less than .0005 MF, as the secondary circuits will otherwise have a choking effect upon the short-wave carrier frequency.

The secondary-frequency circuits are placed in the receiving circuit as shown in Figure 3, using coils and condensers identical in size and characteristics as those in the transmitter.

The operation of the system is best proceeded with as follows:

(a) Adjust transmitter to maximum radiation of carrier frequency.

(b) Gradually increase feed-back coupling between plate and grid coils of secondary-frequency circuits until oscillations are produced, keeping shunt condensers at maximum capacity.

Secondary oscillations can be detected by their effect on the reading of the radiation meter. The system will be at the most efficient operating point when the antenna circuit has **increased** to about ten or fifteen per cent above normal. This increase is due to the change from the average current of the carrier frequency to the R.M.S. current-reading of the super-imposed secondary frequency. If the generation of the secondary frequency stops the carrier oscillations, retune the transmitter to a more stable adjustment.

(c) Couple the compensating key inductance to grid coil as shown in Figure 2, using carbon-granule microphone in place of key if speech transmission is desired.

(d) At the receiving end: Cause the receiver to oscillate at radio frequency weakening coupling between plate and grid secondary-frequency coils to prevent generation of secondary oscillations. Adjust receiver to the tune of the transmitted carrier wave, which can be heard by the heterodyne effect, the beat note of which must be adjusted low enough to be inaudible, in other words, the oscillations of the receiver grid circuit must be in exact synchronism with the received oscillations.

(e) Gradually increase coupling between plate and grid coils of the secondary frequency circuits until oscilla-

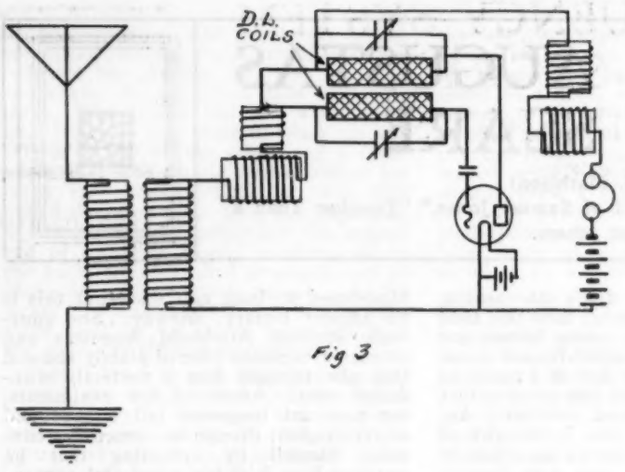


Fig 3

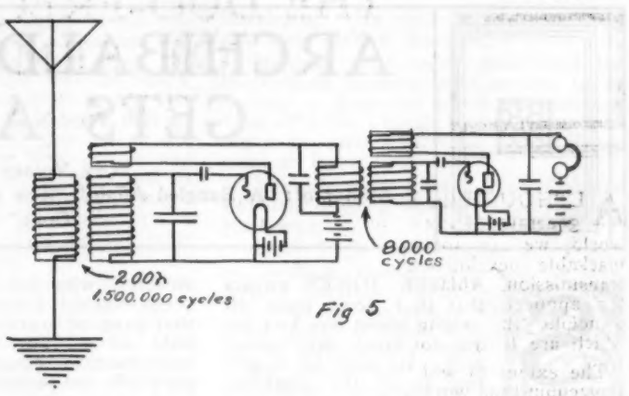


Fig 5

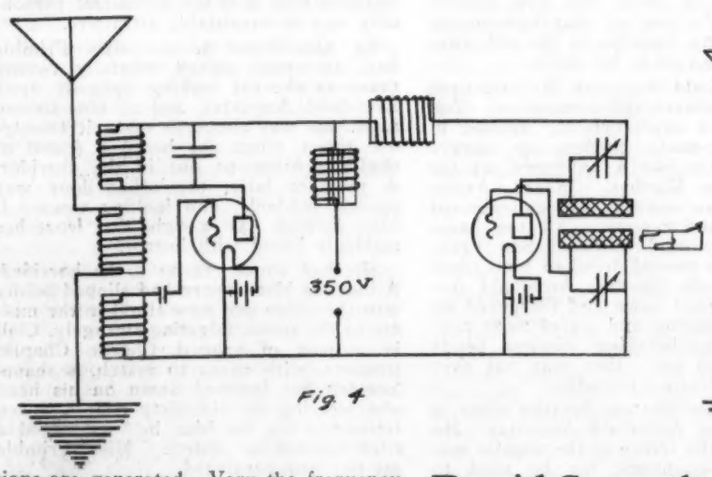


Fig 4

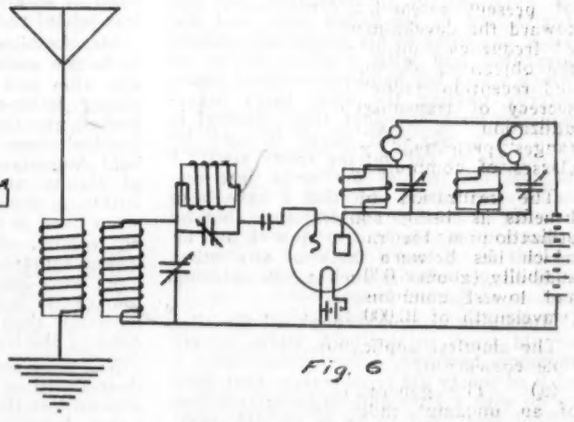


Fig. 6

tions are generated. Vary the frequency so generated by tuning with the condenser shunted around the grid coil, until the **beat note of the transmitted secondary frequency is heard in the phones.** This beat note, and therefore the signals transmitted on it, can only be heard on the ordinary regenerative receiver unless the auxiliary circuits herein described are used.

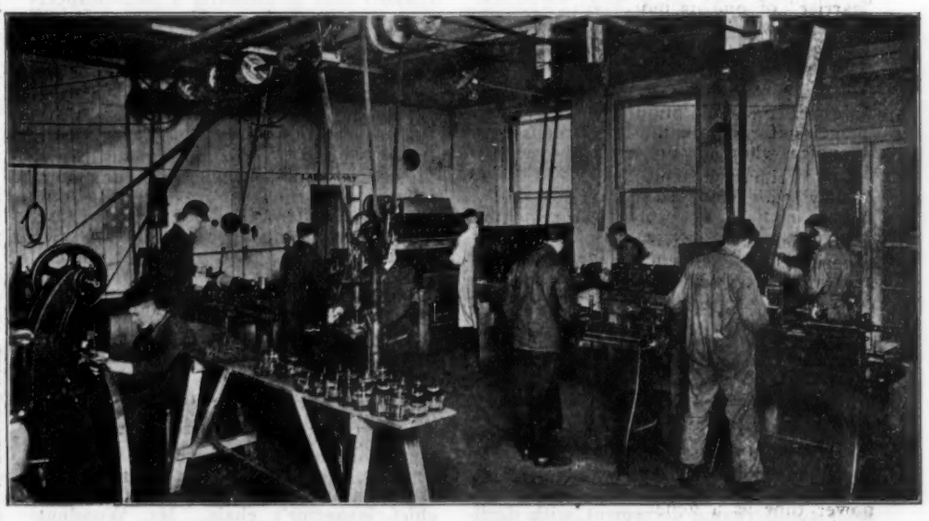
The advantage of such an arrangement are: Secrecy, or semi-secrecy of transmission, increased convenience in heterodyne receiving due to the less critical adjustment of beat note due to lower frequencies heterodyned; possibility of duplex transmission and reception, using compensation method of signalling in both the carrier and secondary frequencies; adaptability of secondary frequencies to multi-step amplification without the drawback of the extremely critical adjustments necessary in the ordinary 200 meter radio-frequency amplification by the r. f. transformer method.

Figures 4, 5, and 6, will indicate the adaptability of the system to the most well-known of modern vacuum-tube circuits.

PALO ALTO WIRELESS $175,000 PLANT IS READY FOR ACTION

The Federal Telegraph Company's new $175,000 wireless station has just been completed, according to Chief Engineer R. R. Beal of the Federal company, and will be the hub unit of a Coast system now being erected in various other parts of the Pacific Coast. This station is the first in the world to carry on communication with four different stations at one time, and has umbrella type of antenna system, with a diameter of 3000 feet. Similar stations are being erected at Portland, Or., and Los Angeles.

Rapid Growth of Pacific Coast Manufacturer



THOSE who have been following radio development in the West have watched with interest the growth and development of The Colin B. Kennedy Company of San Francisco. This organization was started less than two years ago by the man whose name it bears. Following the example of many of the great figures in the world of American business today, Kennedy started in a very small way. In fact he began manufacturing in a small loft with a few tools and the assistance of one boy. He has now associated with him a very capable group of engineer executives to assist in the design and development of the apparatus and in the conduct of the business.

The expanded organization is looking to the future of radio with the same vision which inspired its founder. The radio development of the future is truly linked up with the interests of the individual experimenter and student.

The photograph above, which is reproduced from a recent issue of the "Journal of Electricity and Western Industry", shows a corner of the factory where Kennedy Equipment is produced.

ARCHIBALD AUGUSTAS GETS A SCARE

(By Volney G. Mathison)
Author of: "A Bungled Affair," "The Fall of Samuel Jones," "Tougher Than a Goat," and others.

SAMUEL JONES swears that if I don't leave off writing about him he's going to break my darned neck. He says he is getting to be the laughing-stock of the town and his reputation is ruined (I didn't know it could be). He indignantly declares that a local chemical factory has sent him a letter quoting him special bargain prices on wood-alcohol, formaldehyde, and nitroglycerine in ten-gallon lots; and the other day some of his young lady friends presented him with a pillow cover on which was a big hand-embroidered snake merrily chasing the long, lanky brass-pounder up a cocoanut tree. Samuel is mad is a wet hen about it, and he warns me to cut out the funny stuff. I begged him to let me write just one more story about him that I have been keeping in mind for a long time, but he refused, point-blank. So now I am up against it. I can't think of any other code-slinger who is such a side-splitting jackass as Samuel Jones.

Rumaging around through all the piles of old trash in the back alleys of my memory, however, I have come upon a sack of musty old recollections that have to do with a gone-and-forgotten wireless school that used to be in an old, ramshackle building down near the Frisco water-front. Many years have slipped by since I sat in at the long practice table and went through the daily copying grind, starting in at nine a. m. at the top of the front page of the morning *"Examiner"* and winding up at five p. m. at the bottom of the last page of the evening *"Bulletin,"* but the singing of the practice buzzer and the inky smells from the print shop on the floor above come back to me as vividly as though they were of yesterday.

And no less distinctly do I remember the faces of that assembly of young villains (Samuel Jones were there, too, but I'm not writing about him, remember), who studied the function of the commutator by plastering thin, invisible chips of mica on the lower ends of the brushes, or demonstrated the actions of a closed oscillatory circuit by running a piece of number forty magnet-wire from the spark-gap and deftly fastening the end under the knob of the sending-key, where some poor devil's thumb was sure to get tangled up in it. This stunt was invented by Shakespeare, the school poet, who could rhyme decrement with devilment as easily as he could do sleight-of-hand tricks with spare receivers or detectors or anything else lying around not so big as to rip his coat-pockers. Then we had Kid Brady, the house-breaker, who left his meal-ticket in the school one Saturday night and who, coffee-and-less and hungry, got pinched next morning as he climbed up the rain-spout and jimmied a back-window to get it.

"A very select body of students," the school circular called them, but a very villainous band of hundred per cent hooligans would have been better said; at least so declared Pop Cranby, the instructor, who led a dog's life among them. Indeed, I remember how one time that gang of heartless young hyenas got hold of a poor unsophisticated ham, fresh from the country and in a hurry to get a job, and persuaded him to—but that reminds me of my friend Archibald Augustas. I'm mighty glad I thought of Archibald because he makes me think of a rattling good story, and now Samuel Jones and the rest of that hair-raising band of young Apaches in the old wireless-school can go to the devil.

Mr. Archibald Augustas McGink used to be the assistant radio inspector. Tall and slim and supercorrectly dressed in classy tailor-made clothes, he always looked exactly like a bill-board ad for Kubbleheimer Klothes. Indeed, Archibald Augustas was the very embodiment of dignity and reserve. All the hams within a thousand miles of San Francisco lived in mortal dread of him. And no wonder. In his day, Archibald Augustas shortened down and sharpened up more wave-lengths, and scared more contumacious, law-breaking wireless fiends to death than any other man has ever done in the history of radio.

Nor were the amateur fanatics alone in their dread of Archibald Augustas. He was no less the terror of the regular seagoing brass-pounders; for he used to give them their license examinations. Everybody knows what a cold and unfriendly sort of dungeon a radio-inspector's office is, at best. Everything is stiff and formal and you always get a creepy feeling in the middle of your back as you listen to the dictation of a stern and awful letter proclaiming the license suspension of some depraved operator who has been found guilty of making superfluous signals to the outrageous extent of saying good morning old man to a fellow code-slinger, or perhaps some scoundrelly ham is being skinned and scalped for running his outfit on two hundred and one and a quarter meters, and so on and so on, *ad infinitum*. Put a reserved and coldly proud person such as Mr. Archibald Augustas McGink in such an atmosphere and you could not find a more frigid combination anywhere south of the north pole.

One chilly winter morning, punctiliously at nine a. m., Archibald Augustas stepped dignifiedly into the office, put away his hat and overcoat, bid Miss Frimble, the stenographer, a frozen good morning, and seated himself stiffly in the chief inspector's chair. Mr. Woodnut, the chief radio inspector, had just killed the decrement of the high-power station out at Bolinas, and today he was going out with a shovel to bury it, leaving his assistant in supreme command of the front-line trenches. So Archibald Augustas sat proudly in the chief's big swivel-chair and importantly proceeded to read the morning mail.

While the assistant inspector was thus occupied, Miss Frimble sat gazing upon him; and as she gazed she sighed, deeply and longingly. Tall, skinny, and scrawny, Miss Frimble was the faded yet prim remains of a bud that had bloomed and blossomed so long ago that—but this is no ancient history, anyway. She adoringly idolized Arichbald Augustas and whenever occasion offered plainly showed that she thought him a perfectly wonderful man. Aware of her sentiments, the assistant inspector felt a profound secret disgust; though he sometimes consoled himself by reflecting that he couldn't help it if his wonderful personality was so irresistably attractive.

By nine-fifteen a. m., Miss Frimble had, as usual, sighed wistfully twenty times as she sat looking hungrily upon Archibald Augustas, and at nine-sixteen a. m. she was about to make it twenty-one times, when she heard a sound of shuffling footsteps out in the corridor. A moment later, the office door was opened suddenly, and looking toward it Miss Frimble saw a sight that froze her maidenly blood with horror.

She had ample reason to be horrified. A hideous black negro had slipped boldly into the office and now stood in the middle of the room, fidgeting strangely. Clad in a pair of ragged Charlie Chaplin trousers, with shoes to match, a shapeless felt hat jammed down on his head and wearing an old dirty coat a dozen times too big for him, he was indeed a frightful-looking object. Miss Frimble sat like one paralyzed.

Archibald Augustus had also heard the door open. For a few minutes, he affected to be busy with the mail on his desk; then he ostentatiously swung the big swivel-chair round and condescended to look at the negro, who was still standing, nervously shifting his weight from one foot to the other.

"Well?" interrogated Archibald Augustas, in his best secretary-of-the-navy style.

"I-Iwant to t-take the examination f-for a commercial f-first grade license," stuttered the dark-faced youth, acting as though a good deal embarrassed.

"Very well," replied the assistant inspector, coldly and without interest, "sit there,"—he indicated a small writing table near the stenographer's desk.

"Please give him the application-blanks, Miss Frimble," directed Archibald Augustas, a trifle puzzled at the old maid's evident alarm. It was the first time a negro had ever come to take a license examination, but still there was nothing surprising about it. The assistant inspector swung his chair around again and resumed his reading of the mail.

With extreme trepidation, Miss Frimble picked out the required blanks and laid them on the writing-desk before the frightful-looking negro; and then she fled to Archibald Augustas.

"Mr. McGink, are you blind!" she hissed into the sensitive ear of the assistant inspector. "Can't you see that awful fellow is wearing a disguise?"

Tremendously irritated at the rude way the homely stenographer hissed in his ear, Archibald Augustas shot around in his chair, an angry reprimand burning on his lips. But Miss Frimble's face was a sickly grey, and she was watching the

negro fearfully out of the corner of her eye. Involuntarily, the assistant inspector followed her glances, and with startling suddeness, he perceived that she was right. The fellow was not a negro at all. His face was twice as black on one side as it was on the other, and a small white spot was plainly visible behind his right ear. His slouch hat was still pulled down onto his ears, but there was a bunch of hair resembling the frayed end of a manila hawser sticking out at the back, which looked strangely out of place on such a black person. As he wrote on the application blanks, the black stuff on his hands came off onto the paper, smudging everywhere.

"Yes, I knew he was disguised the moment I saw him," lied Archibald Augustas, affecting a calmness that he absolutely did not feel at all. "Go back to your desk and remain perfectly quiet. "I will—er, I shall attend to him presently."

Bestowing an adoring glance upon Archibald Augustas, in appreciation of his wonderful courage, Miss Frimble retreated to her post, leaving the assistant inspector a great deal more alarmed than herself.

After a few moments, Archibald Augustas cautiously stole another glance at the disguised villain, and a cold dread suddenly clutched at the assistant inspector's heart as he observed that despite the blacking on the fellow's face, he bore a startling resemblance to an ugly-tempered Mexican amateur of North Beach, whom Archibald Augustas had brought to justice not long before for malicious interference with the naval stations, and who had openly sworn that he would be revenged both for the confiscation of his apparatus and for the hundred-dollar fine he had been forced to pay. The more the assistant inspector looked, the more certainly did he seem to perceive that the black scoundrel who had him so neatly corralled was just that same Mexican. Archibald Augustas could see through it all closely. Somehow, the fellow had learned of Mr. Woodnut's absence, and he had chosen this time for getting a bloody revenge.

Archibald Augustas was convinced that he was in awful danger. Already could he feel the keen blade lunging in between his ribs and things, and he winced and sickened as he imagined the grinning murderer taking a savage delight in twisting the knife around in his vitals like an angry farmer cranking a contrary Ford. The assistant inspector broke into a cold sweat. He tried to think what to do, and he immediately realized that there was only one thing to do; he must get away, someway, anyway—and mighty quick.

But that was easier thought of than done. Though there was a window close at hand, it was sixty feet to the street; and the black villian was sitting directly between Archibald Augustas and the door. It was a desperate predicament.

The assistant inspector soon decided that he had better make a dash for freedom rather than sit helplessly waiting for the murderous Mexican to spring upon him. There was a water-cooler near the door, and he made up his mind that he would step over to it, pretending that he was merely going to get a drink of water. Once that far, he would stand a slightly better chance of getting to the door, alive.

Mustering every atom of his insignificant stock of courage, Archibald Augustas arose hesitatingly from the big swivel-chair and walked nervously toward the water-cooler. He got to it safely, and was about to keep on going toward the door, but glancing warily at the disguised malefactor, from whom he was now separated by no more than the width of a desk, he saw that the fellow seemed to be watching him sharply. Instantly, the assistant inspector's mite of courage took wings and flew away. He leaned weakly against the cooler and shakily drew a glass of water. Just as he made to drink it, the pseudo-negro inadvertently bumped his elbow into a large stack of books lying on the table at which he was sitting.

The books fell to the floor with a loud slam. Dismayed, Archibald Augustas involuntarily sucked in his breath, taking the glass of water down his windpipe instead of his throat. Choking and terrified, and still clutching the drinking-glass, he shot to the door in a single stride. About one hundredth part of a second later, he had vanished.

But we must not forget poor Miss Frimble! Fairly petrified with horror and dread at having been thus shamefully abandoned by Archibald Augustas, she could only sit gazing fascinatedly upon the hideous black villain who confronted her.

The pretended negro was obviously much worried at the sudden disappearance of the assistant inspector. Finishing with the application blanks, he became aware of Miss Frimbles' frozen gaze and he began to shift about, nervously.

Minutes passed. The clock on the wall ticked with oppressive loudness in the absolute stillness of the room. Miss Frimble sat as though made of stone, without seeming even to breathe. The disguised stranger became increasingly nervous and fidgety. At last he could stand the scrawny stenographer's horrified stare no longer.

"Aw, what th' heck's the matter with you!" he burst out, in a voice and ascent strangely unlike that of a negro, or of a Mexican either, for that matter. "You don't have to sit there an' look like I was goin' to chew yuh up, you homely old battle-axe!"

"E-e-e-e-e! Murder! Help!" screeched Miss Frimble, springing to her feet and upsetting her chair. Electrified with terror and shrieking like the whistle of a piney-woods logging train, she made a giraffe-sprint to the door.

Just as she got to it, the door was violently thrown open and Archibald Augustas was kicked forcibly into the room by a big brawny policeman, who had the squirming assistant inspector firmly grasped by the back of the neck. Instantly, Miss Frimble threw her arms around her hero and renewed her ear-splitting squeals.

The bluecoat caught sight of the black-faced cause of all the commotion and his eyes bulged with astonishment.

"In th' noime of th' hivinly St. Patrick!" he ejaculated, letting go of the assistant inspector. "No wonder yez was runnin' down the sthreet loike twinty million divils was afther yez, begorrah!"

He slammed the door shut and placed himself against it, while Archibald Augustas struggled to untangle himself from the distasteful embrace of the frantic Miss Frimble.

"Yez be a grand lookin' sight be'ant yez!" exclaimed the policeman, staring at the dark youth's astonishing disguise. "Whur in th' divil did yez come from, an' what be yez thryin' to do here?"

"I know him, officer," panted Archibald Augustas, who has at last managed to free himself from the hysterical Miss Frimble, "He's a fellow we arrested and fined not long ago for malicious interfering. He said at the time he'd get even—he's a Mexican."

"Mexican your foot!" interjected the black-faced mystery, who seemed to be making a desperate effort at calmness, "I'm off'n the Chilean square-rigger lyin' out in the stream off Goat Island, if you want to know!"

"Yez talk more loike a West Oakland hoodlum than a Chileno," retorted the policeman.

"Well, I ain't no Chileno an' I ain't no hoodlum, neither," returned the mysterious captive. "I shipped cabin-boy last year on the steam schooner "*Norwood*" goin' to South America, an' I got left at Valparaiso, down in Chile. Then I got shanghaied onto the "*Madrone*" a Chilean three-masted bark, where I been kept prisoner ever since. We come into Frisco Bay about a week ago an' one night I went over the side an' swum ashore, but the next night the Chilenos spotted me down on the water-front an' they blackjacked me an' took me back aboard. Night before last I jumped out in these clothes an' the black show-paint so the spigs wouldn't nail me again. But I reckon my outfit ain't much good."

"Begorrah, no! Tis mighty quear yez wasn't picked up sooner. But what were yez wantin' up here?"

"I used to have a amateur wireless set once, an' I know a good deal about wireless," replied the captive, promptly. "I was goin' to try an' get a license an' get out on a ship. If I go down on the front an' try to ship cabin-boy again, I'll get crimped again sure."

"What's your noime, an' whur did yez come from in the furrst place?"

"Frank Morris, an' I come from Petaluma."

The policeman scratched his head. The distinguished youth's story was more than half plausible. He was hardly more than a boy, and it was not the first time the bluecoat had heard of victims being shanghaied and held prisoner aboard foul South American hookers. But yet, there was something strange about the fellow's coming into the radio inspector's office while wearing such a make-up.

"I guess yez'll have to tell it to th' judge," decided the policeman, "come along."

The captive protested, strenuously, but the bluecoat got him firmly by the coat sleeve and marched him down the street, accompanied (though not assisted) by Archibald Augustas.

Twenty minutes later the trio were in the police station. The prisoner was handed over for cross-examination to a couple of raspy-voiced detectives, who raked him over the coals for half an hour without succeeding in budging him in the least from his story.

A little later, he was hailed before a police judge. Archibald Augustas and the policeman told of their parts in the affair, and then the prisoner repeated his story, exactly as he had told it before in the radio inspector's office. The judge listened with no great interest; he seemed inclined to accept the youth's statements.

"I don't see that the prisoner is guilty of any particular offense—" he began, but before he could say more one of the detectives came hurrying into the court-room.

"Beg pardon, your honor," he broke in, abruptly, "but we just phoned the marine exchange, and they say there is no Chilean ship of any description in the harbor; and according to the nautical register there's no such vessel as the "*Madrone*" at all.

(Continued on page 347)

NEW YORK RADIO CONVENTION & EXHIBIT SHOWS MARVELOUS ADVANCE IN RADIO DESIGN

(By Arthur H. Lynch)

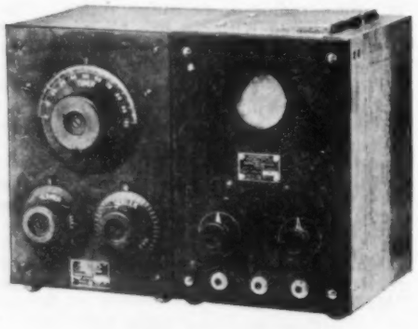
March 16, 17, 18 and 19 were indeed days of great radio activity in New York. A convention and exhibition was held on the roof of the Hotel Pennsylvania, under the auspices of the Executive Radio Council, Second District.

Many new forms of improved apparatus were publicly demonstrated for the first time, and the interest shown proves conclusively that the surface of amateur radio endeavor has only been scratched. Every moment of the event indicated that great strides have been made in the past few months and that the future will be productive of surprises beyond the wildest dreams of yesteryear.

With several complete receiving stations in operation, most of which were equipped with loud-speakers of one kind or another, there was never a quiet moment, and to the uninitiated the affair brought back the story of the Tower of Babel.

Much interest centered about a miniature automobile which was run about the floor, controlled by radio. Its movements were most uncanny, as no human activity was to be noticed and no sound was to be heard. A station, located in the exhibition hall, controlled the action of the auto, which closely resembled a torpedo on wheels and equipped with a mast, from which a spiral coil hung.

Each day was livened by talks, delivered by representative amateur and commercial radio men, and much interest was shown in the speed receiving contest, which was won by Bennie Seuter of the New York "Times" trans-ocean press staff, who attained a speed of 48 3-5 words a minute for two minutes and made no mistakes. Second honors went to N. Bernstein, who attained the same speed, but made two mistakes. Many others stuck in the contest until forty words had been passed, but these two went into the finals alone.



New Devices Demonstrated

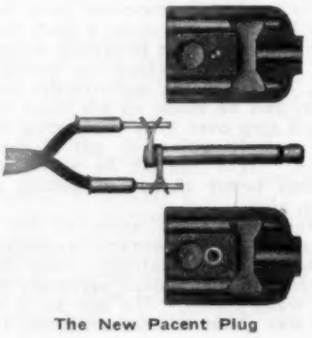
One of the most unique devices shown at the exhibition was as startling in its importance as it was small in size. It was a new type Pacent telephone plug. It is no longer necessary to take off the telephone tips from the cords when the phone is to be used in connection with a plub and jack control outfit. The accompanying illustration tells the story better than words. You will see, from them, that a single screw holds all the members in place. There are two sets of phosphor bronze clips, which are merely pressed together to allow the tips to pass through holes in them, and hold the tips securely when the pressure is released. The same applies to the use of solid conductors. The connected tips are then inserted into the grooves in the moulded bakelite pieces, which are then screwed together. The tension cord, which is usually provided with telephone cords, is held securely between the two bakelite sections, so that everything desired in a plug has been taken care of.

Another innovation, found at the Pacent Electric Booth, was a new form of condenser, developed by Dubilier, for C. W. transmission. The condenser itself is a radical departure, in that it is very small in size and unpretentious in appearance, though it has been well designed and built. Its most conspicuous change from the usual run of Dubilier condensers lies in the fact that it is equipped with a new insulator which will doubtlessly prove of great value to radio in general, but especially to the amateur. It is common knowledge that much amateur antenna current is dissipated because of poor insulation. This new condenser, upon which the insulator is mounted, will go a long way toward increased radiation because of reduction of losses in the power circuits. It is made of many thin sections of pure ruby mica, tightly pressed together and turned to size. After the insulator has been turned to the proper proportions, which includes the making of the flutes, found on insulators of the moulded types designed for the same purpose, it is impregnated by a special compound. The new insulator is soon to be made in forms which may be used for antenna insulation, though the present applications are exclusively for panel and the described mounting.

Radio Corporation on the Job

Among the sages of amateur radio endeavor the opinion was frequently voiced that one could safely bet his bottom "iron man" on the fact that there was money to be made in the manufacture of amateur equipment and the future was all to the good, because the Radio Corporation was going into the thing on a wholesale basis. The opinion was everywhere expressed that they were not going in the amateur apparatus business for the sole purpose of doing the amateurs a favor. Our old friend, Mr. Boucheron, was very much on the job and spent a great deal of his time accepting congratulations from his many friends upon his accession to the throne of Director of Publicity of the Radiocorp. Under the direction of Mr. Galler, who smilingly answered more than a million foolish questions during the exhibition, the amateurs and the professionals were introduced to a most remarkable little piece of apparatus. It is an outfit, made entirely of parts which may be procured from any radio supply house, which Mr. Galler uses for demonstration purposes when he makes visits to such foreign missions as Boston. There is much to say concerning this little outfit. It was designed for connection to any lamp socket, where 110 volts of the A. C. variety is to be found. It is complete, with a carrying case, which measures 12x10x6 inches, including everything.

The set was made by Milford Squire, a former amateur who is making a name for himself as a designer of efficient radio apparatus. The set, complete, consists of everything essential for an A. C. self-rectifying transmitter, including a dummy antenna circuit wherein there is a variable resistance and capacitance, while the regular



The New Pacent Plug

antenna inductor affords the variation of inductance, either in the dummy or regular antenna circuit, depending on the position of the switch. The set has been designed for normal use of 10 watts, but will stand 100 per cent overload, without overheating, so that 20 watts could be consistently delivered to the antenna for demonstration purposes. Though the set was designed for telegraphy, it can be used for telephony by merely inserting rectifiers.

Other New Manufacturers of Note

With several new devices, including storage batteries, battery chargers, crystal detectors and a combination short-wave regenerative receiver unit and a detector and two stage audio frequency amplifier, the Westinghouse Electric and Manufacturing Company is blazing the trail in the race for the lead in the construction of amateur radio equipment. This company has recently secured the services fo many men whose patents and research work in radio will be of value in producing other apparatus to round out the line, which will incorporate all the company's name stands for. If all the apparatus is to be as good as the tuner and amplifier units, it will be good. The circuit is of unique design, in that the inductance and capacity are changed at the same time. There is not enough space to describe it here, but you can take it from one who tried it, the receiver certainly tunes sharply.

Ship Owners' Radio Service, Inc., had a half kilowatt quench spark set hooked up and ran the official station for the transmission of messages, to all parts of the country. For receiving they used a Grebe CR 3 and a Grebe detector and amplifier unit. The transmitter was a Kilbourne & Clark development. At this booth there was also shown a new De Forest radiophone transmitter, but great interest was shown in the new "B" battery which the company has just started to sell. The station cleared forty-eight messages in forty-eight minutes.

Every once in a while from the corner in which Grebe and his company had their booth, a shrill piercing sourd came forth, caused by our friendly enemy POZ. LCM also kept up a continual round of high speed stuff, which gave the fast "ops" an opportunity to exploit their ability to the awe of the beginners and the ladies, most of whom wondered what it was all about. In addition to the regular Grebe line, the CR 6A came in for great attention.

The two illustrations will serve to indicate the general idea of the new line which the De Forest Company now offers for sale. As will be seen, each unit is complete in itself, but lends itself very readily to use with other units, which may be procured at any time. The set in the cabinet is the MIDGET RADIOPHONE, complete, with a short-wave regenerative receiver, made with honeycomb variometers, a detector unit and a single stage amplifier unit. The cabinets may be secured for any desired number of units, but while the set is being gathered together, the legs, shown in the other illustration, serve to hold the units either in the position shown, or upright.

Baldy Phones were much in evidence, both at their own booth as well as in many of the stations which were in operation.

A very complete line of parts, wire and apparatus was displayed by the Shotton Radio Company of Scranton and Albany. They were pushing along the Shramco rheostat, which is made of Nichrome and mounted on asbestos.

Mr. O. Luscomb, president of the Clapp-Eastham Company, and his corps were on the job, giving everyone information on their idea of design and construction. Their apparatus is well known, and they are now introducing a baby knife switch of unique design.

(Continued on page 351)

SIXTH AND SEVENTH DISTRICT AMATEUR STATIONS

CONTINUED

Call	Name	Address	
6ANJ	N. M. Tate		Vacaville, Cal.
6ANK	I. A. Weihe	818 F St.	
6ANL	E. L. Cenner	303 Hopkins St.	Redwood City, Cal.
6ANM	F. J. Elser	Main Street	San Rafael, Cal.
6ANN	E. De Neuf	524 Seventh St.	Petaluma, Cal.
6ANO	W. W. Everett, Jr.		St. Helena, Cal.
6ANP	N. Webster	3240 Lowe Ave.	Fresno, Cal.
6ANQ	H. R. Bradburne	R. 1	Ontario, Cal.
6ANR	J. R. Hubbell	200 Santa Cruz St.	Los Gatos, Cal.
6ANS	D. Rayzliff		Merced, Cal.
6ANT	L. H. Sortais	3729 Stockton Ave.	San Diego, Cal.
6ANU	W. T. Wright	3129 Herman St.	San Diego, Cal.
6ANV	C. Champney	422 Vernon St.	Oakland, Cal.
6ANW	A. R. Stanford	1575 Eighty-first Ave.	Oakland, Cal.
6ANX	G. S. Parsons		El Cajon, Cal.
6ANY	L. R. Saunders	1206 Stanley St.	Ukiah, Cal.
6ANZ	R. Abrahamson	1351 Webster St.	San Francisco, Cal.
6AOA	Wm. Regalia	217 Cypress Ave.	Stege, Cal.
6AOB	H. G. Taylor	Box 55, National Ave.	Los Gatos, Cal.
6AOC	W. Cutting	67 North First St.	Campbell, Cal.
6AOD	W. Hopson	704 Fifteenth St.	Modesto, Cal.
6AOE	J. H. Chase	1323 Lemon St.	Riverside, Cal.
6AOF	F. B. Tinney	265 Lytton Ave.	Palo Alto, Cal.
6AOG	W. N. Simonds	1129 Sacramento St.	Vallejo, Cal.
6AOH	Wm. Peterson	209 West St.	Sebastopol, Cal.
6AOI	C. Park	P. O. Box 237	Riverbank, Cal.
6AOJ	H. O. Snyder	440 Eddy St.	San Francisco, Cal.
6AOK	G. F. Banks	1648 Neale St.	San Diego, Cal.
6AOL	J. H. Neilson	4003 First St.	San Diego, Cal.
6AOM	J. Chambers	318 Valley St.	San Francisco, Cal.
6AON	Piedmont Boy Scouts,	Trp. 1 (port. sta.) Mtn. & Highland Aves.,	Piedmont, Cal.
6AOO	F. J. Thiebaut	121 Seventh Ave.	San Francisco, Cal.
6AOP	S. C. Hight	1822 Sixty-third St.	Alameda, Cal.
6AOQ	J. H. Moulthrop	1112 Pacific Ave.	Alameda, Cal.
6AOR	S. Glasson	2319 Ashby Ave.	Berkeley, Cal.
6AOS	W. C. Rodgers	1016 Pacific Ave.	Alameda, Cal.
6AOT	W. T. Mills	R. R. 1, Box 15	Berkeley, Cal.
6AOU	A. Hoeflich, Jr.	521 Anza St.	San Francisco, Cal.
6AOV	E. Minzenmayer	1616 Forty-eighth Ave.	San Francisco, Cal.
6AOW	P. H. Talbot	310 West Second St.	Pomona, Cal.
6AOX	C. Fick	237 North C St.	San Mateo, Cal.
6AOY	J. L. Stevens	Box 1047	Avalon, Cal.
6AOZ	G. M. Sanders	118 North Mill St.	Santa Paula, Cal.
6APA	H. M. Weston	1 Howard St.	Petaluma, Cal.
6APB	W. G. Simms	302 Sycamore St.	Modesto, Cal.
6APC	C. F. Kratz	1529 Fuller Ave.	Los Angeles, Cal.
6APD	M. Fanning	2513 Wellington Road	Los Angeles, Cal.
6APE	L. E. Lane		Willows, Cal.
6APF	W. H. Halabird	1017 Ocean View Ave.	Los Angeles, Cal.
6APG	J. M. Glessner	2637 Piedmont Ave.	Berkeley, Cal. (portable)
6APH	C. C. Young	318 Valley St.	San Francisco, Cal.
6API	F. L. Dewey	450 Divisadero St.	San Francisco, Cal.
6APJ	F. Hall	211 Edgewood Ave.	San Francisco, Cal.
6APK	V. Hall	211 Edgewood Ave.	San Francisco, Cal.
6APL	J. R. Scanlan	513 Fountain Ave.	Pacific Grove, Cal.
6APM	O. Meyers	General Delivery	Linden, Cal.
6APN	F. J. Conlin	517 Virginia St.	Vallejo, Cal.
6APO	L. Babize	123 East Orange St.	Fullerton, Cal.
6APP	H. Rawls	1258 West Pierce St.	Phoenix, Cal.
6APQ	D. Farran	1044 West Thirtieth St.	Los Angeles, Cal.
6APR	G. H. Taylor		Fall River Mills, Cal.
6APS	H. C. McDonald		Arcata, Cal.

Call	Name	Address	
7YF	Burley High School		Burley, Idaho.
7YG	Y. M. C. A.		Portland, Ore.
7YS	Rev. Sebastian Ruth	St. Martin's College	Lacey, Wash.
7ZB	J. D. Hertz	Box 873 (Station in Portland)	Vancouver, Wash.
7ZD	R. E. Dawes	Box 336	Bozeman, Mont.
7XE	H. P. Sheard		Elk, Wyo.
7ZG	W. E. Slauson		Bear Creek, Mont.
7ZH	O. M. Heacock		Enterprise, Ore.
7ZI	Chas. Austin	1556 E. Taylor St.	Portland, Ore.
7ZJ	E. R. Mumford	518 Beach St.	Vancouver, Wash.
7ZK	Vernon P. Bird	406 W. Twelfth St.	Vancouver, Wash.
7JJ	Douglas Dix	Box 151	Gresham, Ore.
7JK	Frank P. Bloss	792 East Thirty-fourth St.	Portland, Ore.
7JL	Waverly Miller	1704 East Fourteenth St.	Spokane, Wash.
7JM	O. R. Anderson	1114 East Market Street	Portland, Ore.
7JN	Roy Rice		Wapanitia, Ore.
7JO	B. A. McMahon	5137 Willow St.	Seattle, Wash.
7JP	P. W. Dann	Box 974	Astoria, Ore.
7JQ	R. A. Gould		Basin, Wyo.

RECENT SIXTH DISTRICT SPECIAL STATIONS

(March 23, 1921)

6ZT Art Johnson, Fair Grounds, Salt Lake City, Utah.

6ZU L. E. Martin, 100 Olive Avenue, Fresno, Calif.

6ZY F. G. Roebuck, 333 W. Victoria St., Santa Barbara, Calif.

6ZX J. V. Wise, P. O. Box 3, Walnut Grove, Calif.

6ZZ H. L. Gooding, Douglas, Ariz.

U. R. T. A. TO OCCUPY COMFORTABLE QUARTERS

THE Pacific Coast office of the United Radio Telegraphers' Association which has formerly been located at 24 California Street, will be closed and new offices opened at 52 California Street. A large assembly room, containing pool and billiard tables, card tables, writing desks and other conveniences, will be at the disposal of the members. The new quarters are in the heart of the shipping district of San Francisco and within easy reach of the various offices of radio service companies.

Mr. C. Langevin, local chairman of the U. R. T. A., announces that the membership of the organization is increasing rapidly and the financial condition of the association has been sufficiently good to warrant the expenditure of a large sum of money to thoroughly equip the new assembly rooms. The Masters, Mates and Pilots will occupy rooms on the same floor of the building in which the U. R. T. A. is located.

ADDRESS ERRATA

The correct address of station 6EF is 4421 Mettler Street, Los Angeles, Calif.

RADIO CLUB NEWS

SGT. LUFKIN IS NEW PRESIDENT OF S. F. RADIO CLUB

SGT. W. E. Lufkin, former Chairman of the Pacific Coast Radio Convention Committee, was elected President of the San Francisco Radio Club, Inc., on Thursday, April 8th, and will be installed on April 15th. Mr. C. Thompson was elected Vice-President and Mr. C. Shomaker is the new Treasurer. Mr. Highstone is Sergeant-at-Arms; Mr. R. Lyon is Chief Operator and Mr. G. F. Barry retains the office of Secretary.

Major J. F. Dillon, U. S. Radio Inspector of the 6th Radio District, will install the new officers on April 15th.

MAJOR DILLON SPEAKS AT BAY COUNTIES RADIO CLUB

THE U. S. Radio Inspector addressed the Bay Counties Radio Club on April 9th at the usual weekly meeting of the club. Radio laws and legislation were discussed and a most interesting discussion followed.

On April 1, Mr. Babcock, Chief Electrical Engineer of the Southern Pacific Company, spoke on the use of A. C. for radiophone work. He explained the construction of transformers suitable for that work.

The Club has purchased a Mimeograph for the use of printing the club's monthly paper. A complete radio station is being constructed. It will be one of the most modern in the West.

Mr. B. F. McNamee, President of the Club, will entertain the club members with special radiophone concerts. The address of the Secretary, Mr. R. W. Carroll, has been changed to 444 24th Street, Oakland, Calif. The station call is 6BG.

PALO ALTO RADIO CLUB ELECTS OFFICERS

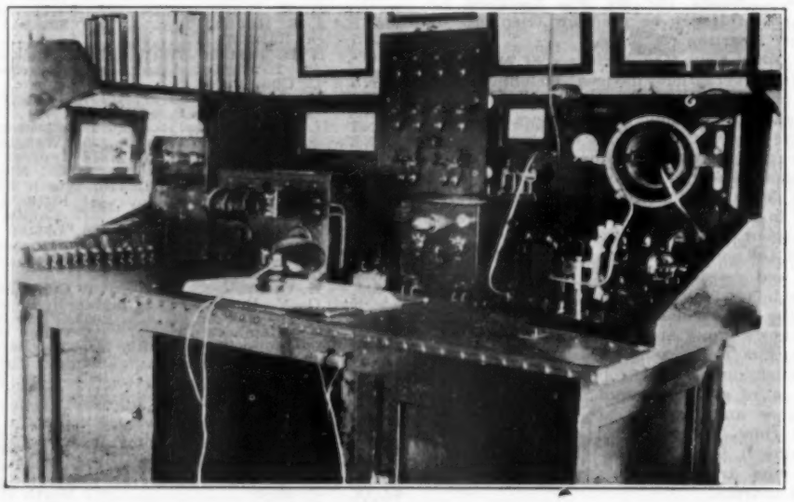
THE following were elected as officers of the Palo Alto Radio Club. President, Hans O. Strom; Vice-President, C. V. Iensen; Secretary, Hatto Tappenbeck; Treasurer, F. W. Kolkmann.

The club now meets at 232 Lytton Avenue, Palo Alto. The club rooms will be open at all times to members and experiments of various nature will be performed. A receiving set and remote control transmitter will be installed shortly. Meetings are held every Wednesday evening. Communications should be addressed to the Secretary, 315 Alma Street, Palo Alto.

TACOMA RADIO CLUB HOLDS BANQUET

RADIO men of the Northwest are rejoicing over the success of the banquet and social affair held in Tacoma, several weeks ago. Radio amateurs and commercial men from various cities in the northern state were present and radio conditions in general were discussed. The stations of various club members were visited the following day. President Reichert of the Tacoma Radio Club spoke on amateur co-operation and his address was appreciated by all. Rev. Sebastian Ruth (7YS), Miss Winfred Dow, Mr. and Mrs. "7CB" and many others prominent in the Northwest were present.

3 B V
WEST CHESTER, PA.



PAUL U. Watson (3BV) believes that you can't get more out of a station than you put into it. Observe the photo of his station closely and it will be readily seen that everything is arranged in "ship-shape." The entire equipment is home made. Honey-comb and Duolateral coils have been used with much success. The following stations have recently been heard: BZR, NAT, VAL, NDD, NSS, NPL, NBA, NPZ, NPG, XDA, NGE, NAX, NAR, NAM, NED, NAJ, and many vessels at sea. A regular tuning chart is kept up-to-date by Watson and it is an easy matter to tune to any wavelength by merely consulting the chart. Baldy phones are used. The transmitter is wired with ¼-inch copper tubing and has done remarkably good work of late.

6 E B -- LOS ANGELES

THE above photographs show the station of Mr. L. F. Seefred, 6EB, Los Angeles, Cal., and the center photo is a good one of the operator. This station is too well known on the Coast to require much comment. Many records have to be added to its credit of late. A short-wave regenerative receiver of the variometer type and a 2-stage amplifier, are doing the trick when it comes to long distance receiving. Everything is home-made, with the exception of the phones. Baldy's are used by 6BE. All howling has been eliminated from the receiving set but local interference from an uncanny buzz from the power lines has been a detriment to better receiving. On high power 750 watts is used. One turn in the OT primary, .01 MF condenser, 1750 RPM rotary and a 5-amp radiation meter complete the transmitting set.

From the 3 to 4 A. m. a straight gap is used. With the exception of the Dubilier Condenser, the transmitter is home made.

CALLS HEARD BY WESTERN AMATEURS

This department has met with such favor that we will devote as much space to same as possible. Unusual Records are Particularly Desirable. Your list should be neatly printed in ink, using one side of paper only. All errors will thereby be avoided.

343 So. Fremont Ave.,
Los Angeles, Cal., March 24, 1921.
"Pacific Radio News,"
San Francisco, Cal.
Gentlemen:

It might prove of interest to the readers of your magazine to know what I have done in the way of long-wave arc reception during the summer months of 1919 and 1920.

Using an Audiotron detector (without any amplifiers), "pancake" type long-wave inductances (using an ultra-audion hook-up with a home-made "Eaton" oscillator) and Baldwin phones on a 200 meter transmitting antenna, I have copied POZ NZR WII WSO NSS NWW NAA NAM NAO NDD NAW BZQ NBA NAT WUJ WZO NPM NPZ NPL NPX, and spark stations KET KIE XDA. All were received with good audibility. POZ was only heard once, but just barely readable, and it was at noon time. He was calling LCM at the time, not only once, but several times. So was sure of it.

Very truly yours,
H. C. Seefred, Radio 6EA.

Calls Heard by Robert Reder, Box 106, Martinez, Cal.

6AH 6AJ 6AR 6BJ 6CC 6CH 6CT 6CV 6DD 6DY 6EJ 6EY 6FH 6FS 6GF 6GN 6GQ 6GR 6HP 6HY 6IC 6IM 6IY(fone) 6JN 6JG 6JR 6KP 6LR 6MK 6NO 6OC 6OA 6WZ 6ZN 6ZR 6XW(fone) 6AAK 6ABJ 6ACA 6ACM 6AGV 6AGU 6ABP 6AIK 6AJF 6ABX 6AGC 6AIU and 7IN.

San Francisco, Cal., March 24, 1921. Pacific Radio News.

Dear Editor:

I see that the calls heard column is getting to be great. The following are a few that I have got:

(5ZA (6AJ) (6DK) (6DP) (6EA) (6EB) (6ED) 6EN (6ER) (6FH) (6FI) (6GF) (6GI) (6GP) (6GR) (6HH) (6IC) 6IF 6IH (6IS) 6IT (6JE) (6JJ) (6JT) (6KA) (6KS) (6KY) (6MH) 6OW (6PQ) 6QL (6QR) (6RN) (6SK) 6TC (6TF) (6TL) 6UY 6VL (6XZ) 6ZH (6ZN) 6AAK 6ABG (6ABP) 6ACR 6ACY (6ADL) 6ADS (6AGF) 6AGP (6AID) (6AIW) (6AJT) 6AJV 6ALA (7BP) (7CC) (7DS) (7IN (7JW) 7LW (7ZI) (7ZJ).

The above have been worked in the last two months. Best 73.

L. VAN GORDER.
Radio 6OC.

Calls Heard and Worked by J. B. Henry, Pasadena, Cal.

I have been interested in looking at the calls heard and so thought I would send in some that I heard in the last three months at Radio 6RN, Pasadena, Cal.

5IF 5ZA (6AE) 6AH (6AK) 6AN 6AR 6AT (6BX) 6CV 6DK 6DP 6EJ 6EX 6FE 6FH (6FI) 6FM 6FS 6FX 6GF 6GO 6GY (6HC) 6HH 6IC 6IG 6JI (6JJ) 6JM 6JN 6JR 6JT 6KL 6KM 6KY 6LD 6LR (6OC) 6OH 6OT 6OW 6PR 6OR 6QS 6SK 6TA 6TC 6TK 6TO 6TV 6VK 6WZ 6XZ 6ZA 6ZH 6ZR 6AAK 6AAT 6AAW 6ABM 6ABR 6ACA 6ACI 6ACM 6ADA ½AFN 6AFP 6AGF 6AGU 6AID 7BP 7CP 7DA 7IN 7ZJ.

These stations are over 50 miles.

Heard by 6FT, Los Angeles, Cal.

5ZA (6AE) 6ACM 6AT 6AGF 6AK 6ADA 6AN 6AH (6BX-CW) 6CF (6DP) (6EJ) 6EX 6QY (6JI) 6JJ 6JI 6JR (6KM) (6XZ-daytime) (6OC) 6OT 6OH 6PR 6QR (6SK) 6WZ 6ZH 6ZX 6ZU 6ZR 6ZL 7CC 7CU 7YA.

Calls Heard at 6OL, Glendale, Cal.

(5ZA) (6AE) 6AI (6AK) 6AR 6AT 6DH (6DK) 6DY (6EJ) 6FH 6FI 6FJ 6GE 6GK 6GO 6GY 6HH (6IC) 6II (6JJ) (6JR) (6JT) 6KL 6LT 6NG 6NO 6OT (6OW) (6PO) (6PR) (6QR) 6OS 6QY (6SK) 6TC 6UO 6AAJ (6AAK) 6AAW 6ABM 6ACA 6ACM 6ADA 6AFN (6AGF) 6AGY 6AHY 6AJX.

Anyone hearing 6OL please QSL. All communications answered. The transmitter at 6OL consists of a ½ KW Thordarson, 8 point Benwood Gap, oil immersed condenser, and Wesrad OT. Radiation, 3 amperes.

Calls Heard and Worked by 6ED, Santa Ana, Cal.

5IF (5ZA) (6AE) (6AH) (6AK) (6AN) (6AR) (6AS) 6AT 6AV 6AY 6BB 6BJ 6BN 6BQ (6BX) 6CA 6CM (6CO) (6CP) 6CS (6CV) 6CZ (6DA) 6DH (6DK) 6DP 6DS (6EA) (6EB) (6EC) (6EF) 6EI (6EJ) (6EN) (6ER) (6EX) (6FH) 6FI 6FN 6FT 6GE 6GH 6GI 6GO 6GP 6GQ 6GT 6GX (6HH) 6HP 6HY (6IC) (6ID) (6IF) (6IG) 6IM 6IQ (6IS) 6IV (6IY) 6JD 6JE (6JJ) (6JT) (6KA) (6KL) (6KP) 6LC 6MA 6MH 6MK 6MT 6MZ 6NB (6NH) 6NY (6OC) (6OH) (6OL) 6OT (6OW) 6PE (6PQ) (6PR) (6PW) (6QR) (6QS) 6RY 6SC (6SD) (6SK) 6TC (6TF) 6VL 6WM 6WN 6WZ 6XW 6XZ 6ZA (6ZB) 6ZE (6ZH) (6ZK) 6ZM (6XN) (6ZO) 6ZR 6AAB (6AAG) 6AAK 6AAT 6AAW 6ACM) (6ACR) (6AGF) (6AJT) (6AJH) 6AIK 6AIW 7AD 7AF (7BJ) 7BK (7BP) (7BQ) (7CC) 7CE (7CU) 7CW 7DA 7DK (7DS) (7ED) 7EX 7FL 7FI 7FN 7GQ 7YA 7YB 7ZB 7ZG (7ZI) 7ZR 7IM (7IN) (7ZJ) 7XX 9AEQ 9WV 9OE 9RR(?) 9YW 9ZN FD NRRS.

My receiver consists of home-made Paragon detector and two-step amplifier transmitter 1KW Acme, Benwood Gap, and home-made oil immersed condenser and OT.

Would appreciate a card from any DX amateur hearing 6ED.

P. S.—6ED reported QSA at 9AHC, Ellendale, N. D., in February.

Calls Heard Month of March at 6BF, Santa Paula, Cal. No Amplifiers

5EA 5IF 5ZA 6AAH 6AAK 6AAT 6AAY 6ABM 6AC 6ACA 6ACR 6ACS 6ACY 6ADA 6ADU 6AE 6AEF 6AER 6AEW 6AF 6AFN 6AFU 6AGC 6AGF 6AGH 6AHB 6AHQ 6AID 6AIK 6AIL 6AIT 6AIW 6AJT 6AJV 6AK 6ALU 6AR 6AT 6AY 6BX-CW 6CC 6DD 6DF 6DK 6DP 6DR 6EA 6EB 6EC 6ED 6EF 6EJ 6EN 6EP 6ER 6EW 6EX 6FH 6FI 6FR 6FS 6GP 6GR 6GY 6HH 6HX 6IF 6IG 6IM 6IY-CW 6IZ 6JD 6JE 6JF 6JM 6JT 6KA 6KI 6KM 6KN 6LC 6LE 6LT 6LX 6MK 6MZ 6OC 6OH 6OL 6OP 6OW 6PE 6PQ 6PR 6QS 6SK 6TC 6TH 6TV (6VZ) 6XZ 6ZA 6ZE 6ZH 6ZK 6ZN 6ZR 6ZS 6ZT 6ZU 6ZX 6ZY 7FI 7HN 7IN 7ZG.

Will answer all inquiries.

Calls Heard and Worked by Radio 6EB

(6DP) 6GR 6HP 6HW-CW 6JM (6JR) (6JT) (6OW) (6QS) 6WZ 6ZS 6ZU 6ZX NRRS-CW YQ-CW (6ACA) 6ABW (6AGF) 6AID 6AIW 6AKH 6ALA 6BAB-CW 7CU 7BJ (7DS) 7HN 7ZG (7ZT) 7ZM 9OE.

Heard by Asa Keller, Cashmere, Wash., from February 18 to April 1.

5CP (Canadian), 6AAK, 6AAR, 6AAT, 6AB, 6ABM, 6ACA, 6ACD, 6ACF, 6ACM, 6ACR, 6AE, 6AF, 6AFU, 6AFY, 6AG, 6AGF, 6AH, 6AI, 6AID, 6AIW, 6AJT, 6AK, 6ALA, 6AT, 6AU 6CC 6CH 6CV 6DK 6DP 6EA 6ED 6EJ 6EN 6ER 6FF 6FH 6FI 6GF 6GR 6GY 6HA 6HC 6HH 6HK 6IC 6ID 6IM 6IR 6JJ 6JM 6JR 6KA 6KC 6KM 6LH 6LK 6LL 6LN 6LR 6LX 6MK 6OC 6OH 6PD 6PR 6QR 6RE 6SR 6TC 6TH 6TS 6TU 6ZK 6ZR 7AC 7AD 7AG 7BC 7BH 7BJ 7BK 7BP 7BQ 7BR 7CC 7CE 7CH 7CK 7CM 7CN 7CQ 7CU 7CV 7CW 7DC 7DH 7DI 7DJ 7DK 7DP 7DQ 7DS 7ED 7EJ 7FF 7FG 7FH 7FI 7FL 7FT 7GA 7GD 7GJ 7GN 7GQ 7GW 7GY 7HF 7HL 7HM 7HN 7HS 7ID 7IN 7IR 7JF 7JR 7JW 7JX 7KJ 7KK 7KU 7LJ 7LN 7LU 7LW 7LY 7MB 7MY 7NB 7QR 7RA 7RJ 7RN 7YA 7YG 7ZH 7ZJ 7ZM 9AFX (heard off and on for three hours on the night of February 14th and the morning of the 15th talking to 9PV during one of the Amrad relays). Single tube and homemade short-wave set is used. By using careful adjustment the Avalon phones come in QSA here.

On the night of March 31 I tried to copy an important message to be given the police or sheriff and it seemed like more QRM than usual had to be going at that time. When something like this is being sent the amateurs in general would appreciate a lull for a few minutes.

The law is to call a station by transmitting its call letters three times and signing three times; but how many stations do you hear every night that obeys it. If I couldn't get the call then it would be more than useless to try to send a message.

Amateur radio stations copied and worked by radio station "YQ" at Avalon Calif.

5IF 5XA 6AAH 6ACA 6ARP 6ABJ 6ACC 6ADL 6AGN 6AHA 6AHQ 6AIK 6AIW 6AIX 6AJH 6AJT 6AJU 6ATN 6ATV 6CR (6DA) 6DK 6DP 6DS 6DU (6EA) 6FB (6ED) 6EF CW&fone 6EK 6EJ 6EN CW&fone 6ER CW&fone 6EX 6FH 6GI 6GP 6GR 6GT 6HH (6HK) 6IF (6IL) 6IG 6IT CW 6IQ 6IS 6IV 6JR (6KA) 6KL 6KM 6KP CW&fone 6LN 6MH 6MK CW&fone 6MZ (6OC) 6OT 6OW 6PC 6PG CW 6PO 6PQ 6PR 6TC (6QR) 6TV 6TY (6XZ) 6ZA 6ZH 6ZK 6ZL 6ZM 6ZN 6ZR 6ZY 6ZZ 6ZU (6XAD) 7BJ 7CC 7EN 7EX 7FI 7FQ 7JJX 7KX 7YA 7YS 7ZI-CW 7ZJ 7ZK 7ZM 8XK-CW 9ACY 8BW 9LR 9OE 9PS 9XI-CW 9XM-CW 9YA 9ZA XF-1-CW KDPV-CW.

Any station hearing "YQ" please QSL, and also any information as to copying signals from this station. The transmitting station consists of a one-wire antenna 25 feet high and 80 feet long. The CW equipment consists of one tube with both the filament and plate voltage supplied from an Acme A. C. transformer, operating on 50 cycle current.

(Continued on page 338)

CALLS HEARD BY 6EA (Additional)

Heard: 5IF 6AAT-CW 6ACR 6AGC 6DD 6FJ 6JM 6PG-CW 6ZU 6ZZ and 7FL.
Worked: 5ZJ 6AAJ 6AFN 6AID 6AIW 6ALA 6BB 6BX-CW 6IM 6KM 6QS 6VM KDPU-CW KDPV-CW NRHW-CW and voice, and "YQ"-CW.

CALLS HEARD AT 6CH

After 11 p. m., from February 1 to April 1

6AGF 6AID 6ACY 6ALX 6ALA 6AJB 6AGU 6AGP 6ABP (6AK) (6CV) 6DP 6DD 6DK 6DR 6EB 6ER (6EA) (6EJ) 6ED (6FH) 6GR 6GP 6GF 6HD 6HH (6IC) 6IS 6IK 6ID 6JJ 6JX 6JD 6KP 6KA 6OQ 6OP (6OW) 6PO 6UQ ½PW (6QR) 6SK 6TV 6TL (6TC) 6VL 6XZ (6ZN) 6ZH 6ZY 7AD 7BQ (7BP) 7BC 7BJ (7CC) 7CA 7CI (7CU) 7CW 7DR 7DS 7FL 7FH 7FT (7IN) 7IC 7NN (7ZI) (7ZJ) 7ZH 7JW 8UE 9WU.

CALLS HEARD DURING MARCH ON GALENA BY FRED W. ADAMS, FLANIGAN, NEV.

6ZN 6ZM 6ZH 6ZQ 6ZR 6ZD 6ZY 6XW 6MN 6MK 6EF 6EJ 6EA 6ER 6DA 6LJ 6LF 6JI 6KI 6OT 6SD 6IV 6ADM 6AJT 6ADM 6ATR 7AD 7BQ 7BC 7BR 7BH 7CB 7CU 7BD 7ED 7FQ 7HR 7NN 7OT 7SF 7WA 7XB 7YA 7YR 7YS 7ZD 7ZJ 7ZK 7ZN 7ZW.

RADIO CLUB DIRECTORY

Published every month. It keeps you posted on important meetings.

United Radio Telegraphers' Association, Pacific Coast Division—Rooms 418-420, 24 California St., San Francisco Cal. Phone Douglas 706. All commercial operators eligible for membership. Address communications to above address.

San Francisco Radio Club, Inc., S. F. Gymnastic Club, Sutter and Divisadero Sts. San Francisco, Calif. Meetings every Thursday evening at 8:30 P. M. Visitors welcome at any meeting except first meeting of the month. Initiation fee $2.50. Monthly dues 50c. For experimental and commercial radio operators, address communications to the secretary. —adv.

6AHS, SAN DIEGO

Heard the following on a crystal detector:

5ZA 6AD 6AE 6AH 6AK 6BD 6BN 6CO 6CW 6DK 6DP 6EA 6ED 6EN 6ER 6EX 6FE 6FH 6FS 6GI 6GN 6GP 6GT 6HY 6IC 6IF 6IG 6IL 6IM 6JD 6JJ 6JM 6JT 6JR 6KA 6KM 6KP 6LC 6MK 6OH 6OW 6PR 6QR 6RN 6TV 6ZA 6ZC 6ZG 6ZH 6ZK 6ZN 6ZO 6ZR 6ZX 6AAK 6AAW 6ABP 6ACA 6ACM 6ACP 6ADL 6ADX 6AFN 6AFY 6AGF 6AIL.

Calls Heard on One Tube from February 1st to March 30tn, 1921, at 6MX, San Francisco

5ZA 6AJ 6AK 6CQ 6DK 6DP 6DX 6EA 6EB 6ED 6EJ 6EN 6ER 6FT 6GP 6GR 6HH 6IM 6IY-CW 6IB 6IC 6JI 6JJ 6JM 6JT 6KA 6KP 6KS 6MA 6MY 6MZ 6OH 6QR 6RN 6SK 6SO 6TC 6TV 6TL 6UO 6VS 6WH 6XZ 6ZX 6ZG 6ZH 6ZN 6AAD 6AAK 6ABM 6ABP 6ACA 6ACF 6ACY 6AOL 6AEI 6AEL 6AGC 6AGF 6AIK 6AIL 6AIW 7AD 7BP 7CN 7CU 7DU 7FZ 7GC 7GQ 7HF 7HN 7ID 7IN 7MY 7YA 7ZI 7ZT.

Calls Heard by 7NG on One Bulb, December 22, 1920, to March 6, 1921

I heard, using one bulb on a regenerative receiving set of the tickler type, the following stations: 7CC 6AH 6AK 6JM 6GY 6PR 6ER 6FE 6BQ 6OT 6EJ 6AC 6IH 6OH 6SK 6AFN 6FH 6AAR 6AGF 6AAW 6MX 6EX 6IU 6KM 6JJ 6CV 6ACM 6ZR 6ABM 6AJT.

Radio 6EX, Berkeley, Cal. (New List)

5ZA 6BS 6DD 6EK (6ED) (6ER) (6FH) 6HH 6IB (6IC) 6ID 6IG 6II 6IL 6IR 6IS 6IT 6IU 6IV (6IY) 6JJ 6JT (6KA) 6KM 6KS (6MH) 6MU 6OT (6PO) 6PR 6RE 6RN (6TL) (6TV) 6UO 6VO 6VY 6WR 6ZA 6ZB 6ZH 6ZM 6ZO (6ZU) 6AAG (6AAK) (6ABP) 6ACD 6ADU 6AEE 6AEI 6AFN (6AFU) (6AFY) 6ACR 6ABG 6AHU (6AID) 6AIK 6AIO 6ALA 6GI 6GT (6GP) (6TC) (6SK) (7AD) 7BC (7BJ) 7BH 7BK 7BQ (7BR) 7CC 7CE (7DA) 7DM 7ED 7FI 7FQ 7FY 7GA (7GQ) 7HN 7ID (7IN) 7IU (7JW) 7JX (7KB) 7LW 7MY 7NN 7QK 7YA 7YS (7ZI) 7ZK 7EX 9LR (6OC?).

List of Calls Heard at 6IV, Riverside, Cal., from March 3rd to March 29

Only those familiar with the conditions in Riverside can in the least way realize the difficulty under which radio work is carried on in Riverside.

6AA 6AE 6AF 6AH 6AK (6AR) 6BX-CW 6CH 6CV 6CZ (6DA) 6DK 6DD 6DL 6DP 6DW 6EA 6ED 6EG 6EJ 6EN-CW and spk 6ER 6EX 6FD 6FH 6GE 6GF 6GI (6GM) 6GP (6GT) 6GY 6HA 6MC (6HG) 6IC 6IF 6IG 6IR (6IS) 6IY-CW 6JM 6JR 6KA 6KL 6KM 6LC (6LI) 6LU 6LX 6LT 6MC 6MK 6NY 6OC 6OH 6OT 6OW 6PJ 6PO (6PR) 6PW 6QR 6RN 6SK 6TC 6TF 6TV (6UK) 6WZ 6XL 6XS 6XZ 6ZA 6ZH 6ZK 6ZM 6ZN 6ZR 6ZU 6ZX 6ZY 6ZZ 6AAAC 6AAG (6AAH) 6AAT 6AAW 6ACA (6ACG) 6ACR 6ADL 6AFN (6AFW) 6AGF (6AGP) 6AGT 6AHQ (6AIK 6AII 6AIO 6AJP 6AJV 6AJX 6AKH 6AOO (6AOP) 7BP 7BQ 7ED 7IN 7YA 7ZI(CW QRA?) 7ZM(QRA?) 5ZA.

Above heard without any steps of amplification. Anyone hearing 6IV please QSL. All acknowledgments answered.

Heard at 7HN, Eugene, Ore., February 1st to March 14th

6AK (6AV) 6AT 6DP 6EA 6EC 6EJ (6ER) (6FH) 6GF 6GQ 6GY 6HC 6ID 6KM 6MZ 6OC 6OH 6OW 6PQ 6QR 6QS 6TV 6TC 6VX 6ZK 6ZR 6ACA (6ACM) 6AFM 6AFN (6AGF) 6AID 6AJ$ 6ALA 6AAD 6AAK 7AD 7BC 7BK 7BQ 7BX 7CC 7CB 7CW 7FI 7FL 7IY 7EG 7LU.

Calls Heard and Worked by C. K. McCormick, Santa Cruz, Cal.

Worked: 6DA, 6DK 6EA 6EB 6ED 6EK 6EN 6ER 6HH 6HT 6IQ 6KM 6KP 6MK 6OL 6SV 6SK 6TU 6TV 6VX 6ZK 6XZ 6ZN 6AAK 6ABP 6ABW 6ACR 6ACY 5ADL 6AFN 6AGF 6AGM 6AGN 6AGP 6AIK 6AJH 6AJV 7ED 7DS.

Stations heard: 6AE 6AH 6AJ 6AT 6BB 6DA 6DD 6DH 6DK 6FH 6IC 6IF 6JJ 6KA 6MH 6MZ 6OC 6OH 6PA 6QR 6RN 6TC 6ZA 6ZH 6ZM 6ZR 7BP 7BQ 7CC 7CU 7CW 7FH 7IN 7LN 7LW 7ZJ.

Heard by 6KS 6VL 6ZM 6ACI 7GQ 7YS. Anyone hearing me, please write.

Heard at 7BP, Portland, Ore., January 1st to March 15, 1921

5ZA (6AE) 6AG (6AH) 6AI 6AJ (6AK) 6AN (6AR) 6AT 6AW 6BB (6CH) 6CO (6CV) (6DK) (6DP) 6EA (6EB) (6EJ) 6EN 6EP 6ER (6FH) (6FI) 6FJ 6GK 6HH (6HP) (6JD) 6JI (6JJ) (6JN) 6JR (6KA) (6KL) 6KM 6KP 6LU 6MK 6NO 6JT (6IC) 6IS (6OC) (6OH) 6OT 6OW (6GF) 6GK (6GR) (6PM) 6PQ (6PR) 6QM (6QR) (6QS) 6RE 6RQ 6SK 6SR 6TC 6TV 6VM 6WZ 6XZ 6ZA 6ZE (6ZK) (6ZM) 6ZN (6GF) 6GK (6GR) (6ZO) (6ZR) 6AAW 6ABK 6ABM 6ABP (6ABW) (6ACA) 6ACM 6ACR 6AEA 6AFN 6AFU 6AFY 6AGC 6AGF 6AID 6AIW (6ACD) 6AJT 6ALA (7AD) 7AS (7BC) 7BG (7BH) (7BK) (7BQ) (7CA) 7CB (7CC) (7CE) (7CW) 7EX 7FI 7FL 7FT 7GY (7HE) (7IN) 7JR 7JX (7LN) 7LU 7NL (7NN) 7FB (7YA) (7YS) 7ZG 7ZH 9LR 9OE 9ZA.

De Forest RADIOPHONE
REG U.S PAT. OFF.

Interpanel Sets

The Most Advanced Idea in Radio Telephone Transmitting and Receiving Apparatus

THE DeForest RADIOPHONE INTERPANEL Set establishes a new standard of design and efficiency for DeForest Apparatus, and provides the most convenient and all 'round satisfactory method of purchasing Radio Apparatus yet invented.

The INTERPANEL Set consists of a series of panels, each constituting a complete piece of apparatus in itself, and designed to be combined with other panels, thus forming a Set complete as may be desired, the operating possibilities depending only upon the total number of panels used. The Set for both Telephone and Telegraph transmission and reception consists of four panels as follows:

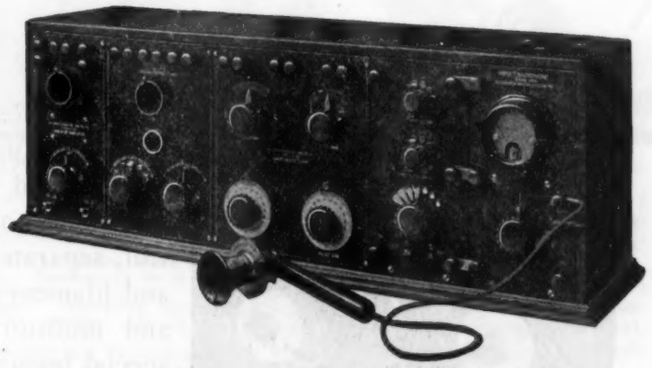
Type MT-100—A complete short wave Tuner of highest possible efficiency;

Type MP-100—A new Audion Control panel designed especially for tubes of the gaseous type, now considered as standard;

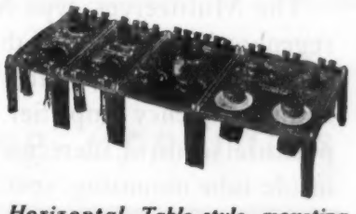
Type MP-200—A one-step Amplifier panel complete in every respect; and

Type OT-3— A complete Radiophone Transmitter, capable of transmitting speech at least 30 miles, and up to 500 miles.

(***Additional steps of amplification may be added as desired***).



Complete Set of Four Units, in cabinet. Each panel sold separately for mounting in home constructed cabinet; or completely assembled in cabinet as shown above. Also for mounting in Horizontal or Vertical Table-style. Complete Set as above, without batteries or tubes; type MS-1; $189.25.



Horizontal Table-style mounting. Legs attached to corners of each panel. Any number of panels can be mounted in this style. Ample space under panels for batteries. A very convenient and inexpensive method of mounting.

Panels are all 9 inches high; varying widths. Designed for placing side by side, with binding posts in line and convenient to wire. Adaptable to any operating requirement. Panels may be bought individually and mounted in operator's own cabinet; or bought completely mounted in cabinet. Or panels alone may be mounted on table in either horizontal or vertical style.

Vertical Panel-style mounting, without cabinet. Two legs hold each panel upright. Any number of panels may be joined and mounted this way.

30 Mile Range for the Telephone Transmitter on Average Amateur Aerial

Tests show a 30-mile telephone transmitting range for the Set, which can be exceeded under favorable conditions. Telegraph range from 60 to 100 miles with unlimited reception possibilities. One 6-volt storage battery required for all filaments and microphone; Motor-generator, "B" Battery or rectifier supply may be used.

The INTERPANEL Set provides the ultimate in RADIOPHONE apparatus; ease and convenience in installation and operation; minimum space, handsome appearance, great efficiency and extreme economy.

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Get the full details of this new INTERPANEL idea, and get your order placed early.

DeForest Radio Telephone and Telegraph Company

Inventors and Manufacturers of High Grade Radio Apparatus

1415 SEDGWICK AVENUE NEW YORK CITY

PARKIN MFG. CO. ISSUES NEW CATALOG

MR. John Parkin, Manager of the Parkin Mfg. Co., of San Rafael, has taken the lead in bringing down the price of radio apparatus to what it was some years ago. The new Parkin catalog is now ready and contains many material reductions in the price of apparatus manufactured by the Company.

WIRELESS ENDANGERING JOBS OF MUSICIANS

THE wireless telephone concerts which are caught daily by 600 amateur operators in this city and about the bay have drawn the fire of the San Francisco Musicians' Union, according to a story told at a demonstration concert during a Commonwealth Club luncheon at the Palace. Complaint has been made that union musicians are being deprived of a living by amateur operators "sneaking" the music sent from the California Theatre apparatus to ships at sea during afternoon and evening performances. The canny telephone brigands are furnishing the music to dance parties, so the complaint goes. The story was told by Lieutenant Ellery W. Stone, general manager of the Moorhead Laboratories of this city, manufacturing the radio telephonic equipment. He predicted that wireless telephones will some day be a part of the ordinary equipment of the home.

ARCHIBALD AUGUSTAS GETS A SCARE

(Continued from page 333)

There was an ominous silence.

The judge regarded the prisoner with an angry glare. Before he could speak, however, there was a violent commotion outside, and a moment later a puffing and perspiring person came rushing undignifiedly into the courtroom. Catching sight of the mysterious prisoner, he stopped and seemed to stagger.

"Good Lord!" he groaned, putting his hand to his head, "You're a sweet-looking sight, all right, all right!"

"How in heck did you find out I was here?" demanded the black-faced enigma.

"How did I find out!" barked the other, mopping the sweat and dust from his face with his handkerchief. "When you didn't show up this morning, and when I saw that hell-fired gang of young hyenas acting so blamed queer and snickering up their sleeves like they were, I knew blasted good and well something was rotten in Denmark: finally I got Kid Brady by the back of the neck and laid him out on a practice-table and sat on him until he spit out the truth. Then I breezed down to the inspector's office, where I found that old sister to a fire-wagon siren babbling something about a black monster, and right away I knew what'd happened, so I rambled up here, —and when it comes to a twenty-four caret, double-barreled damn fool, you take the prize—!"

"Here, here!" yapped the judge, banging on his desk with his mallet. "What does all this mean, anyway?"

"Excue me, Your Honor," answered the new-comer, turning to the judge, "I'm the instructor at the wireless school down on Main Street, and this poor, ignorant, addle-brained image of a countrified jackass is one of my pupils. That gang of criminals down at the school found out he was pretty shy on cash and in a hurry to get a license so he can get a ship; and so they talked him into this confounded crack-brained scheme. They bought the clothes and the nigger-paint, and early this morning they went up to where he rooms and dolled him up. The idea was to take the license examination in disguise, and if he passed all right, to come back in a few days without the coon-town outfit and take the ex over again in his own name. Why that cursed crowd of young ourang-utans made him believe it was a surefire stunt that'd been pulled a dozen times before and—but, Lord, I wish somebody'd tell me what they'll do next, blast em!"—and Pop Cranby mopped his face again.

The crowds in the courtroom were amazed.

"Where did you get that story about the Chilean ship?" demanded the judge of the youthful prisoner.

"The fellows picked it out of a dime novel fer me."

"Holy Mackerel!" groaned Pop Cranby.

Archibald Augustas cleared his throat. His face had become dignified and stern.

"This is outrageous, Your Honor," he began, in his coldest secretary-of-the-navy tone. "It is evident that this person has dangerous criminal tendencies. I suggest that he be sentenced to at least twelve months at hard labor."

Right here, Archibald Augustas overstepped himself. Had he remained silent, things might have gone hard with the adventurous amateur, but the assistant

(Continued on page 350)

CALL LIST ERRATA

The call letters and station address of Mr. W. A. Schonfeldt should be 6TY, 400 Clark Street, Sherman, Calif.

CALLS HEARD BY C. C. WHYSALL LOS GATOS, CAL.

(6DK), (6EA), (6IS), 6BA), (6ADL), (6AID), (6AGF), (7CW), (7ZJ).

ARCHIBALD AUGUSTAS GETS A SCARE

(Continued from page 347)

inspector's overweening assumption piqued the judge.

"I suggest that you keep your mouth shut!" snapped the ruler of the courtroom, glaring at Archibald Augustas with a glassy eye. "The case is dismissed. Get out!"

Fortunately for the young adventurer, Mr. Woodnut, the chief radio inspector had a sense of humor, and in spite of all protests on the part of Archibald Augustas, he insisted that the amazing amateur from Petaluma be permitted to go through with the examination.

The candidate came through with flying colors. Since Mr. Woodnut chanced to be again absent on the day when the lucky amateur completed the examination, it devolved upon Archibald Augustas to check the question sheets. Grudgingly, the assistant inspector checked out a percentage amply sufficient for a license; grudgingly, he got out the license-book and filled out a commercial first-grade license; and thirty minutes later when the new operator came back with the oath of secrecy duly sworn to, he still more grudgingly signed his name to the document.

"The next time you come for an examination in disguise, I would suggest that you engage a performer in a vaudeville minstrel-show to give you a few points regarding the preparation of your costume," he remarked in his extra-best secretary-of-the-navy style, as he handed over the license.

The freshly-made operator rolled up the crinkly bit of paper and stowed it away safely in an inner pocket before replying:

"Humph, I reckon if that cop hadn't grabbed you, you'd be runnin' yet!"—and with this the newly-fledged brass-pounder (er—it wasn't Samuel Jones, remember) drew himself up with all the proudness of an emperor and marched majestically from the room.

(The End)

PACIFIC COAST ADVISORY COUNCIL BENEFITS THE AMATEUR

THE first meeting of the Pacific Coast Advisory Radio Council was held at the Palace Hotel in San Francisco, March 15th. The following radio officials were present: Major J. F. Dillon, chairman of the board; Commander Clark, U. S. N.; Lt. Commander McCaughey, District Radio Communication Superintendent in San Francisco; Captain C. I. Hoppough, U. S. A. Signal Corps, Presidio, San Francisco; Mr. C. Langevin, Pacific Coast Chairman of the United Radio Telegraphers' Association; Mr. A. E. Bessey, Pacific Coast District Manager of the ARRL, and many other radio service company and manufacturers' representatives. A good attendance was had at the banquet and short addresses were delivered by the members of the Council. Commander Clark surprised the gathering with a most interesting address on the Naval Communication Service and the manner in which the navy traffic is taken "from the hook" and sent to the various stations in the world. Immediately after the banquet the meeting of the Council was called to order. Mr. H. W. Dickow introduced the members of the Council and an opening address was delivered by Major J. F. Dillon. Proposals were asked for

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NEW YORK WIRELESS CONVENTION

Continued from page 335)

Federal Telephone and Telegraph Company have several new pieces of apparatus for use in connection with V. T. and C. W. sets, including some filament lighting and "B" potential transformers and telephone jacks which take care of the automatic filament lighting which has come to be such a feature of late.

John Grinan (J. G.), who, in bygone days, was the first to push a spark transmitter signal across the United States, was very much on the job. With his associates of the Continental Company, he was expounding the virtues of the Paragon Ten, which, by the way, was much in evidence in other booths, where receiving sets were kept in operation.

Mesco was also on the "qui vive,' and the writer found Mr. Elts, manager of the Radio Department, perched atop a table in a secluded spot adjoining the lecture hall, where he was listening, unobserved, to a talk by Mr. K. B. Warner of Q. S. T. He is hot on the trail of an association of radio manufacturers and dealers, in which he has been able to create a great deal of interest. Sort of a Love Feast of Competitors.

F. M. Doolittle is belying his name, in that he is not doing little. Several of his new developments have been described in radio papers, but his latest development, and one for which he expresses a great deal of hope, is a new anchor gap, for use in connection with a break-in system. It consists of two plates separated by an insulating substance and held together by a screw and nut passed through the center. The gap is airtight and the surfaces are so close together that the increase in damping is very small.

The Signal Corps and the Navy kept booths in continuous operation, where several outfits, now used by those services, were shown in operation.

Among the other exhibitors were the Acme Apparatus Company, Adams-Morgan Company, American Electro-Technical Appliance Company, American Radio Relay League, American Radio and Research Corporation, Burgess Battery Company, Chicago Radio Laboratories, Experimenter Publishing Company, Lehigh Radio Company, Radio Distributing Company, Super Radio Laboratories, The Radio Club, Irvington, N. J.; C. D. Tuska Company, United States Department of Commerce, Radio Service, Westchester Electric Appliance Company, Inc., Wireless Press, and Y. M. C. A. Radio Schools.

PACIFIC COAST ADVISORY COUNCIL

(Continued from page 350)

and the meeting began in earnest. Prof. Tinsley representing the S. F. Radio Club, read the first proposal. The purpose of the proposal was to secure the sanction of the Department of Commerce for wavelengths in excess of 200 meters for CW work and the abolition of the 300 meter wave for commercial work. Much discussion followed and the proposal was accepted by the Board. Revisions thereto will be made and it will be forwarded to Washington. Chairman Dillon received the wild applause of the evening when he announced that he would endeavor to have ten radio club members recommended for the use of the longer wave. The next meeting of the Council will be held in June.

HARDING OKEHS S. F. WIRELESS PROJECT

R P. Schwerin, president of the Federal Telegraph Company has returned home from Washington, D. C., has been instructed by President Harding and Secretary of State Hughes to go ahead with the company's contract with the Chinese government to construct the largest wireless station in the world at Shanghai. Telegraphic advices from the national capital are to the effect that the Harding administration is confident it can get withdrawn or overruled the protest against the contract made to the Peking government by Great Britain, Japan and Denmark.—S. F. "Bulletin."

S. F. NAVY DISTRICT ESTABLISHES NEW WIRELESS RECORD

THE district banner for naval radio achievements in February hangs in the Twelfth Naval District headquarters.

During February this district received and sent over 1,000,000 words through a distance of almost 300 times the earth's diameter; brought in a ship in the fog by sending wireless bearings; relayed a message from one vessel to another 7000 miles from the first, and sent first aid instructions to the wife of an officer, the victim of appendicitis, isolated on the Farallones.

Commander Scott D. McCaughey is district radio chief.—S. F. "Call."

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RADIO PHONISTS, ATTENTION—HIGH VOLTAGE GENERATORS. We supply motor generator units in various capacities, especially designed for radio phone work. Low powered rotary converters, dynamotors, fractional H. P. motors, storage batteries. Various types of meters, condensers, navy type "4" nickel plate brass engraved dial, spark gap rotors, SYNCHRONOUS SPARK GAPS. RAY-DI-CO RADIO PHONE sets furnished knocked down ready for assembling and your connection. Get acquainted with our SERVICE. RAY-DI-CO, 2653C N. Clark St., Chicago, Ill.

ALL amateur apparatus bought or made in accordance with the Radio Buyers' and Builders' Handbook invariably resell very profitably. Study my June, July, October and December display advertisements. See why and get your copy. R. Clark, Barnes Road, Newton, Mass.

Who mastered Wireless Code in less than sixty minutes by using Dodge Short Cut fifty cent method. Who did this? Ask Dodge. Box 220, Mamaroneck, N. Y.

RADIO CABINETS—Mahogany or oak finished or unfinished, to your design. Send rough sketch for quotation. Prompt service. Formica cut to size. Radio supplies, parts, etc. Pacific Radio Exchange, 439 Call Bldg., San Francisco, Calif.

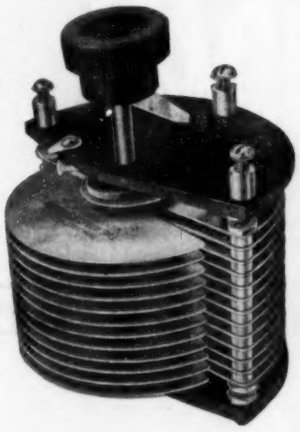
"PRE-WAR" PRICES NOW PREVAIL—Variocouplers wound on bakelite tubes assembled for panel mounting, $5.25; Variometers, inside windings, $4.25. Assemble your own regenerative receivers at one-fourth cost. Oak cabinets with bakelite panels, 5x5x6 in., $2.25; wood rotars, 70c each, centered. We carry all parts for short-wave long distance reception. Meade Bakelite and Radio Apparatus, Dept. P, 975 Putnam Ave., Brooklyn, N. Y.

AUDION DETECTOR AND AMPLIFIER VT., 50 CENTS. Honeycomb coil mountings, 25c cents. Back mounted rheostats, 40 cents. Composition for molding your own knobs, panels, etc., 35 cents pound. Send stamp for particulars. Palmers Electrical Equipment Co., Dept. 5, Palmers, Minn.

FOR SALE—Regenerative receiver, 150 to 600 meters, $25.00; Navy type loose coupler, 6,000 M., $15.00; 2-inch Mesco, spark coil, $10.00; small type coupler, $5.00; Amplifying transformer, mounted complete, $4.50. All apparatus guaranteed like new. Lester F. Wertz, Temple, Pa.

BARGAINS—Audion Panel, $8.25; Couplers, $12.50; Lightning Switch, $2.00; K. D. Condenser, $1.00; Transmitting Condenser, $1.50; Coil Transmitter, $3.50. L. L. Johns, Mulvane, Kan.

THE BEST HONEYCOMB COILS AT THE LOWEST PRICE. Many satisfied customers are using them. Immediate delivery on the following sizes: 25 turns, 45c; 35 turns, 45c; 50 turns, 55c; 75 turns, 60c; 100 turns, 65c; 150 turns, 70c; 200 turns, 75c; 250 turns, 80c; 300 turns, 85c; 400 turns, 90c. Postage extra. Superior Coil Co., 1831 Balboa St., San Francisco, Cal.



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That is the reason the up-to-the-minute amateur was so quick to recognize and specify them. Are you using them in that new set you are building? If not, why not? You can't go wrong, as we fully guarantee them to give satisfaction or cheerfully refund your money. You couldn't ask anything more.

The new "Wireless Shop CW" Variable Condenser was developed to meet the demand for a condenser which would not break down when used with high plate voltages. You don't have to take your receiving condensers to pieces and add spacers any longer. The NEW WIRELESS SHOP CW VARIABLE CONDENSER does the trick.

Heavy construction and only the best of materials and workmanship make this condenser suitable for even the most critical. These condensers are at the present time furnished in three capacities only, but if you need a special capacity for your own particular set, write us. We are especially well equipped to make you anything you may need in the condenser line, as that is our SPECIALTY.

——PRICES——

No. 1500—15 plate, approximately 0004 m. f. max. capacity.....$6.00
No. 2500—25 plate, approximately .0006 m. f. max. capacity..... 7.50
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Regularly fitted with mounting screws and knob and pointer. Will be supplied with a metal dial instead of pointer at 75c additional, or with a moulded Bakelite knob and dial, finely engraved with graduations and numbers filled in white at $1.00 extra.

Postal charges and insurance must accompany all orders. Insurance charges on any of the above condensers is only 5c.

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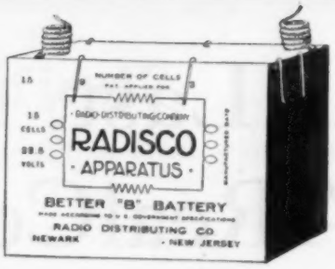
No batteries at the price are as good



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RADISCO BETTER "B" BATTERIES

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powerful sturdy long-lived

Two pages of superlatives couldn't promise more

Since the *still better* Radisco Better "B" Batteries have been at the service of the radio fraternity, amateurs as well as commercial operators, have endorsed them highly, by personal recommendation and by continued use.

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Operating life, 600 to 1000 hours.
15 cells.....22½ volts.

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PROVIDENCE, R. I.
Rhode Island Elec. Equip. Co.
45 Washington St.

PITTSBURGH, PENN.
Radio Electric Co.
3807 Fifth Ave.

PORTLAND, ME.
Atlantic Radio Co.
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SEATTLE, WASH.
Northwest Radio Service Co.
609 Fourth Ave.

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Shotton Radio Mfg. Co.
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